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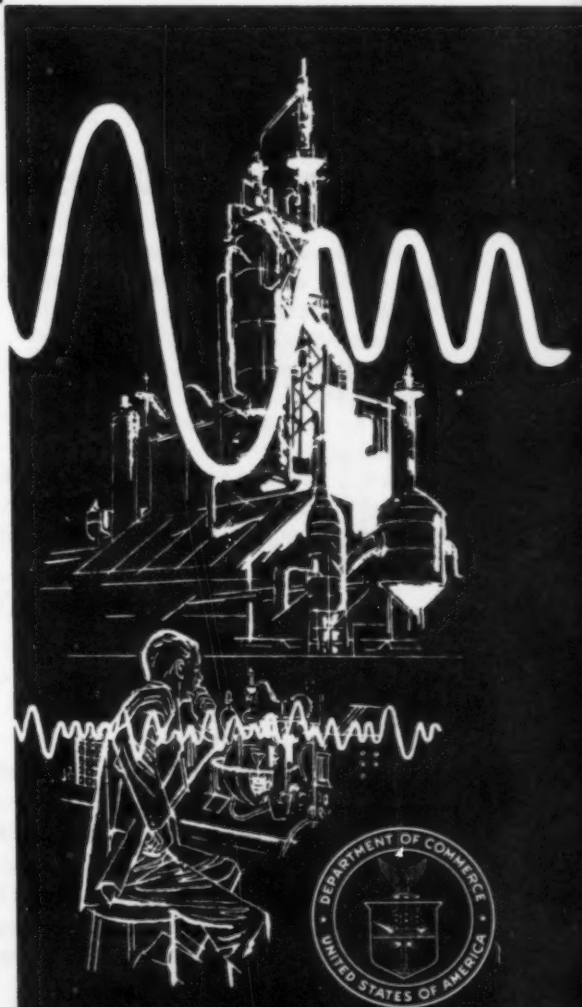

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U.S. DEPARTMENT OF COMMERCE
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STRESS-CORROSION-CRACKING CHARACTERISTICS OF 6AL-4V TITANIUM ALLOY AND 18% AND 20% NICKEL MARAGING STEELS.
AD-405 898 DIV. 17

***TOPOLOGY**
ALGEBRAS

ALGEBRAIC DECOMPOSITION THEORY OF FINITE AUTOMATA.
AD-405 816 DIV. 15

NORMAL MONOIDS AND FACTOR MONOIDS OF COMMUTATIVE MONOIDS.
AD-405 876 DIV. 15

***TORSION BARS**
PLASTICITY

AN INVESTIGATION OF PLASTIC TORSION IN CIRCULAR PRISMATIC BARS WITH A CONCENTRIC OR ECCENTRIC HOLE USING THE SAND-HEAP ANALOGY.
AD-405 143 DIV. 25

***TOXINS & ANTITOXINS**
CLOSTRIDIUM TETANI

IMMEDIATE SENSITIZATION BY ABSORPTION OF ANTIGENS AND ANTIBODIES IN VITRO. ANTIBOVINE GAMMA-GLOBULIN. TETANUS TOXIN. ANTIOVALBUMIN.
AD-404 767 DIV. 16

***TRACKING**

SIMULATED TRACKING DATA GENERATION ROUTINE (SRGR).
AD-405 774 DIV. 30

***TRACKING**
DATA PROCESSING SYSTEMS

PERSONNEL PLANNING INFORMATION OF THE BIRD BUFFER 160A OPERATOR AT SATELLITE TEST STATIONS.
AD-404 723 DIV. 30

***TRAJECTORIES**

STUDY OF FIVE BALLISTIC TRAJECTORIES ORIGINATING IN CALIFORNIA.
AD-405 121 DIV. 12

***TRANSITION ELEMENTS**
METALORGANIC COMPOUNDS

LITERATURE SURVEY ON PREPARATION OF METALS FROM ORGANOMETALLIC COMPOUNDS. TRANSITION AND RARE EARTH METALS WITH THERMAL OR CHEMICAL METHODS OF RECOVERY.
AD-405 564 DIV. 17

***TRANSPORTATION**
SNOW VEHICLES

OVERSNOW TRANSPORT: AN ENGINEERING EVALUATION OF SNOW VEHICLE TRAFFICABILITY.
AD-404 778 DIV. 11

***TRAVELING WAVE TUBES**
DESIGN

THEORETICAL AND EXPERIMENTAL INVESTIGATIONS OF MICROWAVE TUBES SEEKING TUBE DEVELOPMENTS CAPABLE OF 10 MEGAWATTS PEAK POWER: AVERAGE POWER 50 KILOWATTS: BANDWIDTH 30%: GAINS OF 35 DB: AND EFFICIENCIES OF 80%.
AD-404 801 DIV. 8

***TUNGSTEN**
MATERIAL FORMING

TUNGSTEN SHEET ROLLING PROGRAM: PRODUCTION OF 0.060-, 0.040-, AND 0.020-IN.-THICK SHEET MATERIAL: TENSILE PROPERTIES FROM 200 TO 900 F AND FROM 900 TO 2000 F, AND FROM 2000 TO 3000 F.
AD-404 738 DIV. 17

***TUNGSTEN**
MECHANICAL PROPERTIES

THE EROSION OF TUNGSTEN BY SIMULATED ROCKET MOTOR EXHAUST GAS CONDITIONS AND THE EFFECTS OF THERMAL SHOCK ON TUNGSTEN.
AD-405 149 DIV. 27

***TUNGSTEN**
RECRYSTALLIZATION

DEVELOPMENT OF A TUNGSTEN-BASE ALLOY WITH EXCELLENT FABRICABILITY AND A DUCTILE-TO-BRITTLE TRANSITION TEMPERATURE BELOW ROOM TEMPERATURE.
AD-405 857 DIV. 17

***TUNGSTEN**
SINTERING

LITERATURE SURVEY AND PRELIMINARY EXPERIMENTAL WORK ON THE ACTIVATION SINTERING OF TUNGSTEN.
AD-404 782 DIV. 26

***TUNGSTEN ALLOYS**
MATERIAL FORMING

DEVELOPMENT OF A TUNGSTEN-BASE ALLOY WITH EXCELLENT FABRICABILITY AND A DUCTILE-TO-BRITTLE TRANSITION TEMPERATURE BELOW ROOM TEMPERATURE.
AD-405 857 DIV. 17

***TUNNEL DIODES**
DIPOLE ANTENNAS

ANTENNA WITH TUNNEL DIODE.
AD-404 714 DIV. 8

***TURBOJET ENGINES**
TEST FACILITIES

NOISE CONTROL STUDY FOR AIRCRAFT ENGINE TEST CELLS AND GROUND RUN-UP SUPPRESSORS.
AD-404 785 DIV. 27

***TURBULENCE**
ATMOSPHERIC MOTION

NATURE AND OBSERVATION OF HIGH-LEVEL TURBULENCE IN CLEAR AIR.
AD-405 795 DIV. 2

***TURBULENT BOUNDARY LAYER**
GAS FLOW

TURBULENT BOUNDARY LAYER IN A GAS FLOW WITH HEAT TRANSFER AND A PRANDTL NUMBER DIFFERENT FROM UNITY.
AD-405 720 DIV. 9

***TURBULENT BOUNDARY LAYER**
HEAT TRANSFER

TRANSFER PROCESS IN A FREE (JET) TURBULENT BOUNDARY LAYER.
AD-404 909 DIV. 9

***ULTRASONIC RADIATION**
COOLING

INVESTIGATION OF UNCONVENTIONAL COOLING TECHNIQUES: THERMOELECTRIC: ULTRASONIC AND CRYOGENIC COOLING: FABRICATION OF THERMOELECTRIC MATERIALS: SINGLE JUNCTION AND TWO-STAGE: MULTI-JUNCTION THERMOELECTRIC DEVICES.
AD-404 802 DIV. 25

***ULTRASONIC RADIATION**
PROPAGATION

ULTRASONIC BEAM INTERACTION IN SOLID MATERIAL INTERSECTION OF PULSED, 3-15 MC, BEAMS UNDER RESONANT CONDITIONS.
AD-405 068 DIV. 25

***ULTRASONIC RADIATION**
WELDING

ULTRASONIC WELDING PROCESS AND EQUIPMENT FOR CONSTRUCTION OF ELECTRON-TUBE MOUNTS' QUARTERLY PROGRESS REPT. NO. 2.
AD-404 831 DIV. 26

***ULTRAVIOLET DETECTORS**
ULTRAVIOLET OPTICAL MATERIALS

TIME CONSTANTS OF LESS THAN 120 MICROSECONDS AND SPECTRAL SENSITIVITIES IN THE 300 TO 350

MILLIMICRON RANGE FOR UV DETECTORS.
AD-404 912 DIV. 9

UNDERGROUND STRUCTURES
STRESSES

STEP LOAD MOVING WITH LOW SUB-SEISMIC VELOCITY ON THE SURFACE OF A HALF-SPACE OF GRANULAR MATERIAL.
AD-405 153 DIV. 25

UNDERWATER COMMUNICATION SYSTEMS
SONAR SIGNALS

LINEAR SIGNAL PROCESSING THEORY AND MEASUREMENTS. A TIME-VARYING RANDOM LINEAR SYSTEM MODEL IS HYPOTHESIZED FOR THE COMMUNICATIONS MEDIUM.
AD-404 712 DIV. 9

UPPER ATMOSPHERE
PROJECTILES

UPPER ATMOSPHERE SUN PROBE SYSTEM.
AD-405 889 DIV. 22

URANIUM ALLOYS
REACTOR FUEL RODS

ZIRCONIUM-URANIUM COMBUSTION STUDY MELTING AND OXIDATION BEHAVIOR OF FUEL ROD MATERIAL UNDER RE-ENTRY CONDITIONS. NO MELTING OF THE FUEL RODS IS LIKELY TO OCCUR.
AD-405 129 DIV. 21

VACUUM APPARATUS
POWER TRANSMISSION BELTS

DEVELOPMENT OF NON-DESTRUCTIVE SPECIFIC GRAVITY MEASURING EQUIPMENT EMPLOYING RADIATION TECHNIQUE.
AD-405 619 DIV. 20

VIBRATION
ANALYSIS

VIBRATION ANALYSIS OF THE STABILITY OF LIQUID LAYERS.
AD-404 894 DIV. 9

VIBRATION
DRIVE SHAFTS

CRITICAL SPEEDS IN 1/2 INCH DIAMETER STEEL SHAFTS, 138 INCHES LONG WITH APPLICATION TO HELICOPTER ROTOR DRIVES.
AD-404 848 DIV. 1

VIBRATION
STRUCTURES

THE FREE VIBRATION OF FINITE CYLINDRICAL SHELLS.
AD-405 117 DIV. 25

VIBRATORS (MECHANICAL)
BALLISTIC CAMERAS

PERFORMANCE OF A SKYSCREEN SYSTEM USING AN ELECTRICAL ANALOGUE COMPUTER.
AD-405 808 DIV. 24

VINYL PLASTICS
REACTION KINETICS

RATE OF POLYMERIZATION OF BIS(2-CHLOROETHYL) VINYLPHOSPHONATE; EFFECT OF TEMPERATURE, OXYGEN, HUMIDITY, AND CONCENTRATION OF AZOISOBUTYRODINITRILE; KINETICS OF BLOCK POLYMERIZATION.
AD-404 816 DIV. 16

VIRUSES
ETIOLOGY

A TRANSLATION OF FOREIGN RESEARCH ON LABORATORY OUTBREAK OF HEMORRHAGIC FEVER WITH A RENAL SYNDROME.
AD-405 491 DIV. 16

VORTICES
ANALYSIS

VORTEX ANALYSIS OF FLUID FLOWS.
AD-405 131 DIV. 9

WATER SUPPLIES
DAMAGE

AN ASSESSMENT OF THE STATUS OF PREPAREDNESS OF METROPOLITAN WATER WORKS WITH RESPECT TO CIVIL DEFENSE AND A STUDY OF METHODS AND PROCEDURES TO RECOVER DAMAGED SYSTEMS IN EARLY POST ATTACK PERIOD.
AD-405 713 DIV. 18

WATER WAVES
SHIP HULLS

MATHEMATICAL METHODS FOR CALCULATING SHIP HULL FORMS OF DECREASED WAVE-MAKING RESISTANCE.
AD-404 880 DIV. 9

WATER WAVES
UNDERWATER EXPLOSIONS

LONG WAVES AND THEIR EFFECTS ON THE COASTAL AND HARBOR ENVIRONMENT OF LOWER CHESAPEAKE BAY; SEVEN PAPERS.
AD-405 444 DIV. 2

WAVE TRANSMISSION
DIFFRACTION

THEORY OF DIFFRACTION AND REFRACTION IN STRATIFIED MEDIA.
AD-404 897 DIV. 8

WAVE TRANSMISSION
ULTRASONIC RADIATION

ULTRASONIC BEAM INTERACTION IN SOLID MATERIAL INTERSECTION OF PULSED, 3-15 MC, BEAMS UNDER RESONANT CONDITIONS.
AD-405 046 DIV. 25

WEATHER FORECASTING

THE TEXAS DEW POINT FRONT AS SEEN BY TIROS I. THE GENERAL BEHAVIOR OF THE WEST TEXAS DEW POINT FRONT AND THE RELATED CLOUD PATTERNS ARE DESCRIBED.
AD-404 877 DIV. 2

WEATHER FORECASTING STATIONS-DOVER AFB, DELAWARE.
AD-405 137 DIV. 2

WEATHER FORECASTING
ANALYSIS

SUMMARY OF WEATHER FORECASTING FROM TEXAS TOWERS.
AD-405 683 DIV. 2

WEATHER STATIONS

WEATHER FORECASTING STATIONS-DOVER AFB, DELAWARE.
AD-405 137 DIV. 2

WELDING
ULTRASONIC RADIATION

ULTRASONIC WELDING PROCESS AND EQUIPMENT FOR CONSTRUCTION OF ELECTRON-TUBE MOUNTS; QUARTERLY PROGRESS RPT. NO. 2.
AD-404 831 DIV. 26

ULTRASONIC WELDING OF REFRACTORY METALS AND ALLOYS; PRELIMINARY INVESTIGATION WITH POWER-FORCE PROGRAMMING APPLIED TO SPOT WELDING OF 2024-T3 ALUMINUM ALLOY, AISI 304 STAINLESS STEEL, AND INCONEL X.
AD-405 896 DIV. 26

WIND TUNNEL MODELS
SUSPENSION DEVICES

A MAGNETIC MODEL SUSPENSION AND FORCE MEASUREMENT SYSTEM FOR A MACH 4.8 WIND TUNNEL.
AD-404 804 DIV. 1

WIND TUNNELS

DESIGN METHODS FOR LOW-DENSITY WIND TUNNELS OPERATING AT HIGH STAGNATION TEMPERATURES.
AD-404 810 DIV. 30

WIND TUNNELS
SUPPORTS

A MAGNETIC MODEL SUSPENSION AND FORCE MEASUREMENT SYSTEM FOR A MACH 4.8 WIND TUNNEL.
AD-404 804 DIV. 1

WINDSHIELDS
MOISTUREPROOFING

RAIN REPELLANT FOR AIRCRAFT WINDSHIELDS. METHOD OF MANUFACTURE. SILICONE-TITANIUM COPOLYMERS. STORAGE STABILITY IN AEROSOL PACKAGES. ETHYL SILICATE FOR USE IN RAIN REPELLANTS.
AD-405 895 DIV. 1

WOOD
PROCESSING

AN INVESTIGATION OF CERTAIN WEST INDIAN HARDWOODS.
AD-404 886 DIV. 14

ZINC COMPOUNDS
SULFIDES

STUDY OF THE GENERAL FEATURES OF THE ANOMALOUS PHOTOVOLTAIC EFFECT IN CRYSTALS OF ZINC SULFIDE, BY EXTENDING HUTSON'S MODEL AND FORMULATING THE PROBLEM IN TERMS OF INDEPENDENT PHOTOVOLTAGE GENERATORS IN EACH SEGMENT OF THE CRYSTAL; ONE CAN ACCOUNT FOR ALL THE FEATURES OF THE SPECTRAL RESPONSE OF THE APP.
AD-405 648 DIV. 25

ZIRCONIUM ALLOYS
REACTOR FUEL RODS

ZIRCONIUM-URANIUM COMBUSTION STUDY MELTING AND OXIDATION BEHAVIOR OF FUEL ROD MATERIAL UNDER RE-ENTRY CONDITIONS. NO MELTING OF THE FUEL RODS IS LIKELY TO OCCUR.
AD-405 129 DIV. 21

ZONE MELTING
RARE EARTH ELEMENTS

ULTRA HIGH PURITY RARE EARTH METALS; SAMARIUM, EUROPIUM, GADOLINIUM WITH TOTAL IMPURITIES OF LESS THAN 0.1 PPM WERE ATTEMPTED TO BE MADE. METHODS OF SEPARATION, REDUCTION AND PURIFICATION WERE: ION EXCHANGE, DRY FLUORIDE PREPARATION, METALLOTHERMIC REDUCTION, VACUUM DISTILLATION, ZONE REFINING BY INDUCTION HEAT AND ELECTRON BEAM MELTING.
AD-405 751 DIV. 17

TECHNICAL ABSTRACT BULLETIN

1 AIRCRAFT AND FLIGHT EQUIPMENT

AD-404 804 Div. 1, 8, 30, 7
(TISTE/OHD) OTS price $11.00

Massachusetts Inst. of Tech., Cambridge.
THE DESIGN AND INITIAL OPERATION OF A MAGNETIC MODEL SUSPENSION AND FORCE MEASUREMENT SYSTEM,
by Edward Lee Tilton, III, William J. Parkin, Eugene E. Covert, James B. Coffin, and John E. Chrisinger. Jan 63, 136p.
Contract AF33 616 7023, Proj. 7065, Task 7065 01
ARL 63 16
Unclassified report

Descriptors: *Wind tunnel models, *Wind tunnels, *Suspension devices, *Electromagnets, Design, Power supplies, Thyratrons, Control systems, Circuits, Solenoids, Optical equipment, Servo amplifiers, Electronic equipment, Cooling, Packaged circuits, Supports, Magnetic fields, Airplane models.

The design, construction and proof tests of a magnetic model suspension system capable of use in a M = 4.8 wind tunnel is described. The results indicate that the model can be suspended magnetically during the wind tunnel starting conditions, that the model can be angulated and lift and drag forces measured with the model at angle of attack. (Author)

AD-404 848 Div. 1, 26
(TISTE/OHD) OTS price $4.60

Battelle Memorial Inst., Columbus, Ohio.
DESIGN CRITERIA FOR HIGH-SPEED POWER-TRANSMISSION SHAFTS.
Quarterly rept. no. 1 on Phase 2,
by J. B. Day, R. G. Dubensky, H. C. Meacham, and J. E. Voorhees. May 63, 1v.
Contract AF33 657 10330, Proj. 8128, Task 812802
ASD TDR62 728 Unclassified report

Descriptors: *Drive shafts, *Vibration, Standing-wave ratios, Transmission lines, Phototubes, Measuring devices (Electrical and electronic), Helicopters, Design, Theory.

Standing wave ratios for 1/2-inch-diameter steel shafts, 138 inches long, were calculated for the cases in which dampers were designed to minimize vibration at the 4th and 6th critical speeds. Calculations were based on an analogy relating electrical transmission lines to high-speed shafts. The calculated standing wave ratios will be compared with measured amplitudes of vibration observed in experiments using the high-speed shaft test machine. An optical device utilizing a photocell and a light source was built to measure amplitudes of vibration along the length of the shaft. A brief study of present helicopters, taking into account engine speed, power, and helicopter size, indicated that the speed range through which power-transmission shafting will need to operate includes speeds up to the sixteenth critical speed. Shaft eccentricity measurements have been made on commercial shafts. These measurements will be used in digital computer calculations to predict actual shaft vibration amplitudes. (Author)

AD-404 850 Div. 1, 5, 6
(TISTP/JEA) OTS price $16.00

Martin Marietta Corp., Baltimore, Md.
AIR FORCE FLIGHT CONTROL AND FLIGHT DISPLAY INTEGRATION PROGRAM.
Final summary rept., 1 Mar 62-28 Feb 63,
by C. A. Gainer. Feb 63, 1v. ER12905
Contract AF33 657 8600
Unclassified report

Descriptors: *Human engineering, *Display systems, *Flight control systems, *Flight instruments, Effectiveness, Air control centers, Vision, Radar landing control, Aircraft cabins Coding, Colors, All-weather aviations, Ground controlled approach radar, Pilots, Visibility Acceptability.

The Martin Company provided human engineering support to a number of Air Force programs being conducted under Project 6190. The extent of task activities were broad in scope and quite diverse in subject matter. Members of the group were involved in research projects, consulting activities, reviews of literature and methodological development. Each of these kinds of tasks are briefly reviewed and the topics investigated are discussed. The subject matter of these tasks in part consisted of controller studies, display evaluations, display development, performance and opinion measurement, and program planning. (Author)

AD-405 475 Div. 1
(TISTE/JWS) OTS price $4.60

Republic Aviation Corp., Farmingdale, N. Y.
RESEARCH INVESTIGATION OF HYDRAULIC PULSATION CONCEPTS.
Quarterly progress rept. no. 1, 5 Mar-31 May 63. 31 May 63, 27p. RAC933 1
Contract AF33 657 10622, Proj. 8128, Task 812807
Unclassified report

Descriptors: *Hydraulic systems, Hydraulic pressure pumps, Hydraulic servomechanisms, Hydraulic actuators, Hydraulic valves, Fluid dynamic properties, Tests, Hydraulic cylinders, Aircraft.

Layout design of a pulsation generator was completed. The use of an electrical analogy was considered as a basis of pulsating system analysis, and a block diagram representation of a typical system was derived. To facilitate the derivation of system flow and pressure parameters, a miniaturized two-phase pulsating system is being constructed. (Author)

AD-405 852 Div. 1, 26
(TISTE/JWS) OTS price $1.60

Kaysam Corp. of America, Paterson, N. J.
PRODUCTION ENGINEERING MEASURE FOR MANUFACTURE OF METEOROLOGICAL BALLOONS TYPE ML-541 ( )/UM.
Quarterly progress rept. no. 4, 19 Jan-18 Apr 63, by Murray Miner, ed. by John Kantor. 18 Apr 63, 10p.
Contract DA36 039sc85988
Unclassified report

Descriptors: *Meteorological balloons, Production, Synthetic rubber, Rubber coatings, Positioning devices (Machinery), Manufacturing methods.

The cross-bar dipping conveyor concept has been abandoned in favor of a one-cylinder turntable. Careful analysis indicates that the one-cylinder turntable has advantages of economy, simplicity, and safety. The major portion of the head-balloon dipping machine is now specified. Several components have already been received. The basic functions of the various components of the dipping machine have been described. (Author)

AD-405 895 Div. 1, 14, 4
(TISTM/PCR) ORS price $1.50

Snell, Foster D. Inc., New York.
RAIN REPELLENT.
Final rept.,
E. Swindell, E. McDonnell and J. Mitchell Fain, 10 Apr 63, 53p.
Contract NOw62 0557
Unclassified report

Descriptors: *Moistureproofing, *Windshields, Aircraft equipment, Aerosol generators, Sprays, Coatings, Films, Silicone plastics, Costs, Manufacturing methods, Oils, Titanium, Copolymerization, Polymers, Stability, Storage, Silicates, Catalysts, Raindrops.

A rain repellent Formula 2911K-394, was developed, and is packaged in aerosol containers. Spraying of the repellent into the windstream hitting the windshield under rain conditions forms a coating which provides visibility. Application of the repellent to a dry panel and treatment with a solution of p-toluene sulfonic acid in alcohol results in a film having good life when subjected to rain spray and resistance to both jet fuel and isopropyl alcohol. The use of 10 centistoke methyl silicone oil, as contained in Formula 2911K-394, produces a film having improved resistance to jet fuel. (Author)

2. ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-404 717 Div. 2
(TISTP/MH) OTS price $5.60

ITT Federal Labs., San Fernando, Calif.
STELLAR IRRADIANCE MEASUREMENTS.
Final rept.,
by Freeman F. Hall, Jr. Jan 63, 51p.
Unclassified report

Subcontract to Aerospace Corp., Los Angeles, Calif. Contract AF04 695 169.

Descriptors: *Infrared radiation, Infrared spectroscopy, Infrared spectrophotometers, Radiometers, Blackbody radiation, Night sky, Detection, Spacecraft, Calibration, Measurement, Stars.

The results of a scan of the night sky in three spectral regions of the infrared are presented. Radiometer with instantaneous field-of-view and a nodding Newtonian secondary mirror was used in the study to obtain the results over a six weeks observation period in which 18% of the sky was scanned in the near IR. Several bright IR sources were detected which would not have been expected on the basis of extrapolation of their visual properties and assumed temperatures. It is shown that such extrapolation of the supposed blackbody properties of stars to predict infrared magnitudes becomes progressively less reliable for the cooler stars and may fail by many magnitudes for the M7 and M8 classifications. A number of sources were detected which do not correlate with the position of any known stars brighter than eighth visual magnitude; some stars show much greater IR brightness than expected, which may indicate the presence of cool companion stars. The method of data recording and an assessment of accuracy and reliability of the results are presented and recommendations made for a more comprehensive survey to allow a proper understanding of the infrared background which might be experienced in space. (Author)

AD-404 734 Div. 2
(TISTP/FR) OTS price $7.60

Naval Ordnance Test Station, China Lake, Calif.
A CLIMATOLOGICAL SUMMARY OF THE SURFACE AND UPPER AIR WEATHER AT NOTS (1946-1962),
by Paul H. Miller. Dec 62, 74p.
NAVWEPS 7960
Unclassified report

Descriptors: *Meteorological parameters, *Deserts, Wind, Dust storms, Humidity, Rainfall, Thunderstorms, Cloud cover, Temperature, Temperature inversion, Jet streams (Meteorology), Tropopause, Barometric pressure, Density, Atmosphere, High altitude.

A 17-year summary is given of surface and upper-air climatological conditions experienced at the U. S Naval Ordnance Test Station and over the Indian Wells Valley area in which the Station is located. (Author)

AD-404 746 Div. 2
(TISTP/MFA) OTS price $1.60

Naval Research Lab., Washington, D. C.
THE PRIMARY COSMIC RADIATION,
by M. M. Shapiro. 25 Apr 63, 9p.
NRL 5896 Unclassified report

Descriptors: *Cosmic rays, Radioastronomy, Interstellar matter, Hydrogen, Helium, Lithium, Beryllium, Boron, Nuclei, Sun, Stars, Isotopes, Nucleous, Energy, Earth.

Some salient features of the cosmic radiation incident upon the earth and implications of the Li-Be-B anomaly and the helium isotope abundances are discussed. The abundance ratio of cosmic-ray hydrogen to helium is similar to that for the thermal abundances in the sun and nearby stars. The other nuclei, particularly Li, Be, and B, are overabundant relative to hydrogen. Lower limits of cosmic-ray-particle flux and density for total energies exceeding 1.7 x 10 to the 9th power ev per nucleon are 0.28 particle sq cm/sec-sterad and 1.2 x 10 to the -10th power/cu cm, respectively. The energy density is comparable to that of starlight. NRL measurements indicate that the cosmic-ray abundance of Li, Be, and B at kinetic energies above 1.5 x 10 to the 9th power ev/nucleon is 2 x 10 to the 5th power times their general abundance. An assumption that this overabundance arises from the breakup of heavier nuclei permits estimates of the amount of interstellar hydrogen traversed, one estimate being 2.5 g sq cm. The relative abundances of the helium isotopes are being investigated as a further means of calculating cosmic-ray path lengths. (Author)

AD-404 750 Div. 2, 16, 30
(TISTM/CCH) OTS price $22.25

Defense Documentation Center, Cameron Station, Alexandria, Va.
OCEANOGRAPHY. A REPORT BIBLIOGRAPHY.
Bibliography for 1953-Mar 63,
comp. by Esther E. Thompson. May 63, 1v.
Unclassified report

Descriptors: *Oceanology, *Bibliographies, Marine biology, Aquatic animals, Fishes, Marine borers, Algae, Plankton, Sea water, Chemistry, Desalination, Salinity, Mechanical properties, Structural properties, Ice, Economics, Hydrographic surveying, Marine geophysics, Marine geology, Marine meteorology, Beaches, Reefs, Ocean bottom, Ocean currents, Ocean waves, Tides, Measurement, Temperature, Oceanographic equipment, Instrumentation, Scientific research, Symposia.

This bibliography on oceanography includes its biological, chemical, economical, physical aspects as well as marine geology and applied oceanography. Citations are included for all unclassified reports, without release limitations, that were acquired by DDC from 1953 to March 1963.

AD-404 752 Div. 2
(TISTP/WH) OTS price $1.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
GROUND TEMPERATURE OBSERVATIONS, ANIAK, ALASKA,
by George W. Aitken and C. W. Fulwider. Aug 62, 14p.
CRREL TR101 Unclassified report

Descriptors: *Temperature, Thermometers, Permafrost, Climatology, Polar regions, Soils.

Summaries are presented of (1) ground temperature data at 9 depths from 0.0-22.0 ft collected daily at Aniak (Alaska) during 1947-1958, (2) comparative climatological data collected by the U. S. Weather Bureau for the years 1944-58, and (3) soil data from samples obtained in August 1956 and July 1958. Tables are given of (1) the mean or average climatological data, (2) the maximum, minimum, and average ground temperatures for the 11 years as determined from data recorded on the first day of each month, and (3) the ground temperatures recorded the first day of each month during the 1947-58 period. Seasonal freezing varied slightly from year to year; the average seasonal depth of freeze was approximately 3.5 ft below the ground surface. The data show that there is no permafrost at the temperature-well location to a depth of 22.5 ft.

AD-404 825 Div. 2
(TISTP/MFA) OTS price $1.10

Texas A and M Coll., College Station.
STRUCTURE OF THE CONTINENTAL SHELF, NORTHEASTERN GULF OF MEXICO.
Preliminary rept.,
by John W. Antoine and James L. Harding. May 63, 18p. R63 13T
Contract Nonr211904, Proj. NR083 036
Unclassified report

Descriptors: *Structural geology, *Geology, Geologic age determination, Sedimentation, Stratigraphy, Tables, Geophysics, Seismic waves.

AD-404 873 Div. 2, 15, 30
(TISTP/CCH) OTS price $9.60

Visibility Lab. U. of Calif., San Diego.
RESTORATION OF ATMOSPHERICALLY DISTORTED IMAGES.
Progress rept.,
by James L. Harris. Mar 63, 109p. SI063 10
Contract NObs84075, Proj. 7400; ARPA152 60
Unclassified report

Descriptors: *Optical equipment, *Images, *Mathematics, *Distortion, Mathematical analysis, Models (Simulations), Computers, Programming (Computers), Scanning, Astronomical data, Films, Frequency, Noise, Effectiveness, Measurement.

A program of research on possible means of accomplishing restoration of atmospherically distorted images was conducted. Considerable progress has been made in the development of techniques which may be suitable for the restoration of images. (Author)

AD-404 877 Div. 2
(TISTP/WH) OTS price $3.60

Texas A. and M. Coll., College Station.
THE TEXAS DEW POINT FRONT AS SEEN BY TIROS I,
by Walter K. Henry and Aylmer H. Thompson.
1 Feb 63, 28p. SR3
Contract AF19 604 8450, Proj. 6698, Task 66982
AFCRL 63 244 Unclassified report

Descriptors: *Dew point, *Meteorological satellites, *Weather forecasting, Clouds, Air mass analysis.

The general behavior of the West Texas dew point front and the related cloud patterns are described. Several TIROS I pictures of West Texas and the surrounding area were selected for special study; these pictures included also examples when the dew point front was absent. The examples generally showed good agreement between the dew point front and cloud pattern as pictured by the satellite. The match between the cloud patterns and the location of the dew point front was not perfect due partly to the thin layer of moist air near the surface location of the dew point front, and occasionally, higher cloud layers, usually cirrus, which partially masked the location of the dew point front as

pictured by the satellite. A few cases occurred where cloud patterns similar to those associated with the dew point front were present, but for which no dew point front was present. Of special interest is a case of collapse and surge of the dew point front. (Author)

AD-404 878 Div. 2
(TISTP/FR) OTS price $8.10

Naval Oceanographic Office, Washington, D. C.
SUBMARINE GEOLOGY OF THE TONGUE OF THE OCEAN, BAHAMAS,
by Roswell F. Busby. Nov 62, 84p.
NOO TR108
Unclassified report

Descriptors: *Sedimentation, *Ocean bottom sampling, Marine geology, Underwater photography.

Seventy-three sediment cores, 6 grab samples, and 4 stereographic camera tracks were taken on the bottom and flanks of the Tongue of the Ocean, Bahamas. Laboratory analyses show the bottom sediment to be predominantly silt-sized skeletal and nonskeletal carbonate particles of both deep and shallow water origin. Organic carbon content of the sediment is low, averaging between 1.0 and 2.0 percent. Water content, void ratio, and porosity decrease with depth in the sediment, while conversely, density and cohesion increase. Sediment accumulation in the channel can be attributed to slow, continuous particle-by-particle deposition from the overlying water column and turbidity current type deposition originating on the upper walls and bank edges of the channel. The latter type accumulation accounts for over 50 percent of the sediment column sampled. Rate of sediment accumulation is extremely high along the flanks and central reachs of the southern portion in the channel. Stereographic photographs of the channel bottom show a paucity of benthic animal or plant life, and, in general, an almost featureless unconsolidated ooze is pictured. In the central, northern portion of the channel at 1,000-fathoms depth, a limestone outcrop is present containing cavities or basins suggestive of subaerial erosion at some earlier geologic time. (Author)

AD-404 895 Div. 2
(TISTP/FR) OTS price $3.60

Woods Hole Oceanographic Institution, Mass.
OCEANOGRAPHIC AND UNDERWATER ACOUSTICS RESEARCH CONDUCTED DURING THE PERIOD 1 MAY 1962 - 31 OCTOBER 1962,
by J. B. Hersey. Mar 63, 32p. R63 9
Contracts Nonr136700 and Nonr212900,
Projs. NR261 102 and NR261 104
Unclassified report

Descriptors: *Oceanology, Marine geology, Marine geophysics, Underwater sound equipment.

During the perio 1 May-31 October 1962, several long North Atlan ic Ocean cruises were made on the R.V. Chain, which continued investigations of sound transmission and gravity, made continuous seismic refraction profiles, and used radio-acoustical buoys to study the sound reflecting properties of the sea floor. Tests of new instruments and short term investigations were made from the R.V. Bear in waters near Woods Hole. (Author)

AD-404 917 Div. 2
(TISTP/FR) OTS price $4.60

RAND Corp., Santa Monica, Calif.
CLOSE-IN ELECTROMAGNETIC FIELDS PRODUCED BY NUCLEAR EXPLOSIONS,
by W. Sollfrey. Apr 63, 26p. RM3525PR
Contract AF49 638 700
Unclassified report

Report on Proj. RAND.

Descriptors: *Electromagnetic fields, Nuclear explosions, Magnetic fields, Electric fields, Electrons.

The close-in electromagnetic fields produced by deflection in the earth's field of Compton electrons from a nuclear explosion are analyzed. Maxwell's equations in spherical coordinates are solved by an expansion in the perturbation fields, taking into account the space and time dependence of the conductivity and Compton current. The field structure is determined, and it is shown that the peak change in field is only 10 per cent. (Author)

AD-405 023 Div. 2
(TISTP/MFA) OTS price $5.60

Lockheed Aircraft Corp., Burbank, Calif.
PROCEEDINGS OF SECOND INTERINDUSTRIAL OCEANOGRAPHIC SYMPOSIUM, DECEMBER 11, 1962, SANTA BARBARA, CALIFORNIA.
1962, 51p.
Unclassified report

Original contains color plates; all DDC reproductions will be in black and white. Original may be seen in DDC Hq.

Descriptors: *Oceanology, *Marine geophysics, Oceans, Buoys, Electronic equipment, Acoustic properties, Measurement, Ocean waves, Sound, Ocean models, Microstructure, Symposia, Oceanographic equipment.

AD-405 040 Div. 2, 8, 6
(TISTM/CCH) OTS price $4.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
CONSEQUENCES OF SYMMETRY IN PERIODIC STRUCTURES,
by P. J. Crepeau and P. H. McIsaac. 15 Feb 63, 1v. RR1113 63
Contract AF19 604 7499
AFCRL 63 104
Unclassified report

Descriptors: *Microwaves, Rotation, Magnetic fields, Frequency, Structural properties, Electromagnetic fields.

Periodic guiding or radiating structures at microwave frequencies frequently possess symmetry properties in addition to their axial periodicity. These include rotation and reflection symmetries, whether occurring alone or in conjunction with translations. These symmetries influence the characteristics of the electromagnetic fields associated with the structures. Therefore, useful information concerning the fields can be obtained from the symmetry properties without resorting to detailed field solutions or to equivalent circuit analogs. These symmetry properties are conveniently analyzed by introducing symmetry operators under which the structure is invariant. This analysis shows that two symmetries, the screw and the glide, are particularly important in determining the characteristics of the fields. Some of the implications of these symmetries for leaky wave antennas and microwave tube interaction circuits are explored. The consequences of screw and glide symmetries, together with five other possible symmetries, are examined to facilitate the analysis and synthesis of periodic microwave structures. (Author)

AD-405 137 Div. 2
(TISTP/MH) OTS price $9.60

Air Weather Service, Scott Air Force Base, Ill.
TERMINAL FORECAST REFERENCE FILE, DOVER AIR FORCE BASE, DELAWARE.
1v.
Unclassified report

Descriptors: *Weather forecasting, *Weather stations, Climatology, Thunderstorms, Snow, Atmospheric pollution, Atmospheric precipitation, Meteorology, Fog, Visibility.

AD-405 138 Div. 2, 1
(TISTP/FEM) OTS price $9.10

Massachusetts Inst. of Tech., Cambridge.
MARINE GRAVIMETRY FROM AN AIRCRAFT,
by Wayne T. Frye and Karl J. Whitaker. June 63, 96p.
Unclassified report

Master's thesis.

Descriptors: *Gravity, *Instrumentation, *Earth models, Aircraft, Altimeters, Low altitude, Oceans, Mapping, Air speed, Surveying, Navigation, Doppler navigation, Errors, Mathematical models, Earth, Data, Data processing systems, Inertial navigation, Equations, Linear systems, Accelerometers, Measurement, Stabilized platforms, Navigation charts.

A method is presented for rapidly surveying the gravity field of the earth over that portion of the surface covered with water. The techniques cannot approach the accuracies attainable with stationary gravimeters. The oceans of the earth comprise the majority of the gravimetrically uncharted portion of its surface. Only gravity measurements at sea is discussed in this work. (Author)

AD-405 144 Div. 2
(TISTP/MFA) OTS price $5.60

Massachusetts U., Amherst.
EOLIAN GEOMORPHOLOGY, WIND DIRECTION, AND CLIMATIC CHANGE IN NORTH AFRICA.
Final rept.,
by H. T. U. Smith. Mar 63, 48p.
Contract AF19 628 298, Proj. 7628, Task 762805
AFCRL 63 443 Unclassified report

Descriptors: *Geology, *Deserts, *Climatology, Terrain, Sand, Photo interpretation, Atmospheric precipitation, Rock (Geology), Erosion, Wind, Analysis.

The North African desert belt is a region of temperature extremes, strong winds, and negligible rainfall. Wind action has been a major geologic process. Erosional effects comprise enclosed basins and various residual rock knobs and ridges, commonly elongated parallel to dominant wind direction. Depositional effects comprise sand streamers, drifts, and dunes. Active dunes may be classed as simple, compound, and complex. Compound dunes comprise barchan, transverse, and longitudinal types, and are transitional into simple types on the one hand, and complex types on the other. Complex dunes are the most widespread, and show extreme diversity in character. They may be grouped as longitudinal, peaked, domal, ridged, and undifferentiated. They are believed to have been formed by divergent winds, and to have had a complicated development history. Stabilized or 'fossil' dunes occur in a broad belt bordering the Sahara on the south, and represent a former expansion or shift of the desert belt. Where original form has not been too greatly modified by non-eolian processes, dune forms similar to those found farther north in the active stage may be recognized, and it is probable that some of the latter passed through a stabilized state at one or more times in their history. (Author)

AD-405 162 Div. 2
(TISTP/MFA) OTS price $10.50

Missouri School of Mines and Metallurgy, Rolla.
EXPERIMENTS ON THE MEASUREMENT OF THE RESPONSE OF ROCK TO DYNAMIC LOADS.
Final rept.,
by Rodney D. Caudle and George B. Clark. Mar 63, 1v.
Contract AF29 601 2821, Proj. 1080, Task 108001
AFSWC TDR62 153 Unclassified report

Descriptors: *Rock (Geology), *Dynamics, *Blast, Strain gages, Nuclear explosions, Pressure gages, Tests, Test equipment, Piezoelectric transducers, Piezoelectric effect, Ceramic materials, Piezoelectric gages, Cylindrical bodies, Ferroelectric materials, Transients, Pressure, Impedance matching, Capacitors, Resistance (Electrical), Petn, Instrumentation, Explosive materials, Stresses, Measurement, Loading (Mechanics).

The development of instrumentation techniques to measure dynamic stress and strain within rock subjected to impulse-type loads is presented. These techniques were to be applicable to the determination of rock response to nuclear explosive loadings. Electric resistance strain gages and piezoelectric stress gages were the sensing devices utilized. Transducers were embedded in concrete test cylinders which were loaded by a plane wave generated by high explosive. The sensitivity of the piezoelectric gages utilized was too great for the stress intensities developed, and therefore satisfactory evaluation of the stress measuring technique was not possible. The material presented, summarizing the theoretical aspects of stress and strain measurement at an interior point in a solid, may prove valuable in future embedded gage installations. (Author)

AD-405 444 Div. 2
(TISTP/FR) OTS price $15.50

National Engineering Science Co., Pasadena, Calif.
INVESTIGATION OF LONG WAVES AND THEIR EFFECTS ON THE COASTAL AND HARBOR ENVIRONMENT OF THE LOWER CHESAPEAKE BAY. VOLUME II.
Apr 63, 1v. TR SN93
Contract DA49 146XZ151
DASA 1355 Unclassified report

Descriptors: *Water waves, Underwater explosions, Nuclear explosions, Ocean bottom, Estuaries.

Contents:
Long waves generated by nuclear explosions. Type of waves and initial decay in deep water
Theoretical considerations and computations for water waves produced by explosions
Surface waves generated by disturbance on sea bed in constant depth open sea
The principle of superposition and the theory of Cauchy-Poisson
The shoaling, damping, breaking and run-up of long waves over the continental shelf. On saturated and nonsaturated breakers
The wave run-up by the method of characteristics
Two-dimensional nonlinear wave motion in an estuary

AD-405 445 Div. 2, 30
(TISTP/MFA) OTS price $3.60

Cambridge Systems Inc., Newton, Mass.
AN/GMD-2 WIND ERRORS FROM SALTON SEA TEST SERIES.
Final rept.,
by D. P. Keily and D. J. Beaubien. Apr 63, 32p.
Contract AF19 628 1686, Proj. 6682, Task 668201
AFCRL 63 463

Unclassified report

Descriptors: *Meteorological instruments, Meteorlogical parameters, Phototheodolites, Measurement, Reliability, Errors, Tables, Radio receivers, Tests.

The results of the Salton Sea Meteorological Instrumentation Test Series (MITS) are analyzed and extended to include root mean square errors in the wind speed, range, elevation and azimuth angles, as measured by the AN/GMD-2 Rawin Set, for a series of representative flights. Criteria are presented as guidelines for conducting additional field tests in order that such tests will generate sufficient data to permit the determination of rms wind errors to a higher degree of confidence and accuracy than that which is currently attainable. An effort is made to categorize the wind errors derived, on the basis of established errors in the altitude, slant range, azimuth and elevation angles. (Author)

AD-405 480 Div. 2
(TISTM/ODN) OTS price $1.10

Naval Civil Engineering Lab., Port Hueneme, Calif.
INVESTIGATION OF SCALE REMOVAL FROM THE EXTERIOR OF HORIZONTAL TUBES EVAPORATING A THIN FILM OF SEA WATER,
by R. M. Gisler. 31 May 63, 3p.
Task Y R011 01 052
NCEL TN508

Unclassified report

Descriptors: *Scale, *Evaporators, Heat exchangers, Tests, Sea water, Distillation, Sulfuric acid, Films, Test equipment, Pipes.

The purpose of this test was to investigate scaling in horizontal tube, spray tube evaporators that have high heat transfer coefficients. These evaporators employ circulation through spray nozzles which produce a falling film over heating surfaces. The test consisted of the intermittent operation of an evaporator which was modified from a used heat exchanger. Heat was supplied from low pressure steam. Scale formation was observed visually through a window in the unit. Before the test was concluded, the unit was treated with sulfuric acid to remove the scale. It was concluded that this type of evaporator had scale problems very similar to conventional type evaporators and that the same type of scale control treatment is effective. (Author)

AD-405 616 Div. 2
(TISTP/MFA) OTS price $12.50

New York U., College of Engineering, N. Y.
WAVE SPECTRA ESTIMATED FROM WAVE RECORDS OBTAINED BY THE OWS WEATHER EXPLORER AND THE OWS WEATHER REPORTER (II),
by L. Moskowitz, W. J. Pierson, Jr. and E. Mehr.
Mar 63, 1v. GSLR63 5
Contract N62306 1042

Unclassified report

Descriptors: *Ocean waves, Meteorological parameters, Weather forecasting, Wind, Oceanographic data, Ships (Non military), Programming (Computers), Recording systems, Digital recording systems, Meteorological charts, Tables, Noise, Analysis.

As a part of the problem of developing numerical wave forecasting procedures for the North Atlantic Ocean, selected sequences of the weather maps for the North Atlantic for which wave data were known to be available were studied in detail for the five year period beginning in April 1955 and ending in March 1960. Data from a hurricane in September 1961 were also analyzed. Certain dates and times of observations were selected for a variety of reasons for study. For these dates and times, the National Institute of Oceanography provided copies of the wave records that were obtained by the OWS Weather Explorer and by the OWS Weather Reporter. In total, about 800 wave records were provided, and a complete spectral analysis is planned for about 400 of these records. Data are presented in tabular and graphical form of the results of these analyses. The total number of spectra given is 290. (Author)

AD-405 683 Div. 2
(TISTP/MFA) OTS price $1.60

4th Weather Wing, Colorado Springs, Colo.
A CASE HISTORY INVESTIGATION OF WINTERTIME STORMS WHICH PRODUCE SUSTAINED SURFACE WINDS 50 KNOTS OR GREATER AT TEXAS TOWER 2 AND TEXAS TOWER 3 - PART 2. SUMMARY OF RESULTS.
9 Aug 61, 9p.
4WW TP63 6

Unclassified report

Descriptors: *Meteorology, *Weather forecasting, Wind, Meteorological parameters, Storms, Analysis.

This supplement to the study, 'A Case History Investigation of Winter Storms which Produce Sustained Surface Wind Speeds 50 knots or greater at Texas Tower 2 and Texas Tower 3,' summarizes forecasting experience on the tower forecasting project using the procedures outlined in the study. The study was published in September 1962. However, the forecasting procedures set forth in the study were completed on 18 December 1961 and were used as forecasting guides from that date. (Author)

AD-405 719 Div. 2, 15
(TISTP/AM) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ON THE NEW FORMULA OF THE INTENSITY OF RADIATION AND NEW CHARACTERISTICS OF THE TRANSPARENCY OF THE AIR,
by Kh. Myurk. 25 Apr 63, 8p.
FTD TT63 178

Unclassified report

Trans. from Issledovaniya po Fizike Atmosfery, AN Estonskoy SSR, Institut Fiziki i Astronomii, No. 1, pps 7-14, 1959.

Descriptors: *Solar radiation, *Atmosphere, Integral equations, Integration, Functions, Intensity, Optical properties.

AD-405 795 Div. 2
(TISTP/JEA) OTS price $3.60

Colorado State U., Fort Collins.
NATURE AND OBSERVATION OF HIGH-LEVEL TURBULENCE ESPECIALLY IN CLEAR AIR,

by Elmar R. Reiter. Dec 62, 28p. TP41; CER62ERR76
Contract N189 188 55120
NWRF 15 1262 071 Unclassified report

Descriptors: *Atmospheric motion, *Turbulence, Aircraft, Conviction, Gravity, Pattern recognition, Wind, Vertical gust recorder, Temperature, Stability, Vortices, Guided missile trajectories, Flight paths, Flight control systems, Wind direction indicators, Measurement, Clouds, Pressure, Atmosphere, Balloons, Correlation techniques.

This is a ''state-of-the-art'' report on clear-air turbulence (CAT) research. Knowledge of micro-structural details of flow patterns in the free atmosphere is of importance to aircraft and missile designers. It also is of interest in considering passenger comfort. There may be at least three different causes for bumpiness experienced by an aircraft flying horizontally: convective currents, gravity waves on interfaces and temperature discontinuities intercepted by a supersonic aircraft. For vertical take-off vehicles excessive shears of alternating sign in the vertical wind or momentum profiles should be considered as possible sources of vibration. So far, observations of high-level turbulence have been made by aircraft and by balloon-borne gust sondes. Especially aircraft measurements present a problem inasmuch as the response characteristics of the vehicle usually make it difficult to evaluate the actual atmospheric gust input. With our present theoretical modelling capabilities we may be able to study wave perturbations in the free atmosphere from detailed measurements of wind and temperature profiles. Such measurements will have to be orders of magnitude more accurate however, than the ones provided by the synoptic rawinsonde and radiosonde network. (Author)

AD-405 885 Div. 2
(TISTP/TL) OTS price $21.00

Massachusetts Inst. of Tech., Cambridge.
STUDIES OF THE STRATOSPHERIC GENERAL CIRCULATION
Final rept.,
by Victor P. Starr. 30 Nov 62, 358p.
Contract AF19 604 5223, Proj. 8628, Task 862807
AFCRL 63 435 Unclassified report

Descriptors: *Atmosphere, *Stratosphere, Atmospheric motion, Atmospheric sounding, Heat transfer, Periodic variations, Kinetic theory.

The aim of the studies reported in the publication was to elucidate the various mechanisms by which the budgets of energy, angular momentum and mass for the stratospheric region are satisfied. In this work use was made of the data gathered during the International Geophysical Year. Similar studies for the atmospheric regions from the surface up to 100mb were reported previously and it was found that large scale quasi-horizontal eddy processes proved to be the principal agents in the transfer of angular momentum, in the generation of mean zonal kinetic energy and in the transfer of heat energy. It appears that the processes in the stratosphere are more complicated. (Author)

3. CHEMICAL WARFARE EQUIPMENT AND MATERIALS

AD-405 886 Div. 3, 13, 20
(TISTE/JBM) OTS price $3.00

Naval Research Lab., Washington, D. C.
STUDIES OF THE BUREAU OF YARDS AND DOCKS PROTECTIVE SHELTER. I. WINTER TRIALS.
31 Dec 62, 156p.
NRL 5882 Unclassified report

Descriptors: *Shelters, *Blast, *Radioactive fallout, *Biological warfare, *Chemical warfare, Psychology, Reinforcing materials, Steel, Ventilation, Sanitary engineering, Water supplies, Environmental tests, Temperature, Heat, Electric power production, Motor generators, Nutrition, Physiology, Medical research, Naval personnel, Tests.

A two-day and a two-week winter trial were conducted in a protective shelter (blast, radioactive fallout, and biological and chemical warfare) designed by the Bureau of Yards and Docks. One hundred Navy volunteers served as the shelter subjects. The primary purpose of these trials was to study the engineering features of the shelter. The shelterees, selected from a group of volunteers, were screened both medically and psychologically. Both trials were conducted successfully, with no major difficulties encountered. The ration, basically survival-ration crackers and soup, provided approximately 1800 kilogram calories per man per day. Weight-loss studies indicated that this was a marginal ration. Water was unlimited for drinking purposes but prohibited for personal hygiene; under these conditions, the average total water consumption was 1.8 quarts per man per day. Inlet air temperatures during the trials varied from 12 to 55 F. Although no artificial heating was provided in the shelter, inside temperatures were maintained between 70 and 80 F by adjusting the air-ventilation rate. Hot bunking (30 bunks for 100 men) proved to be an acceptable procedure. Psychological studies indicated that food, lack of water for washing, crowding of the shelter, dirt and behavior of others were the five leading sources of discomfort. By similar measurements, bunks, lights while sleeping, odors and temperature and humidity were considered least bothersome. (Author)

4. CHEMISTRY

AD-404 719 Div. 4, 22
(TISTM/EJH) OTS price $1.60

Picatinny Arsenal, Dover, N. J.
APPARATUS FOR GENERATING GASEOUS HYDROGEN AZIDE AND METHODS OF PREPARING SOME SELECTED AZIDES,
by Bruno Reitzner and Ralph P. Manno. May 63, 11p.
Proj. 599 25 001
PA TM1186 Unclassified report

Descriptors: *Azides, *Explosive materials, *Hydrogen compounds, Barium compounds, Sodium compounds, Potassium compounds, Calcium compounds, Strontium compounds, Lead compounds, Ammonium compounds, Gases, Laboratory equipment, Purification, Carbonates, Hydroxides, Synthesis (Chemistry).

An apparatus for preparing relatively large quantities of gaseous hydrogen azide was designed. The hydrogen azide prepared can be used for reactions in the gas phase as well as in solutions. Methods for preparing sodium, potassium, ammonium, calcium, strontium and barium azides were developed. An attempt was made to prepare lead azide by reacting hydrogen azide with lead oxide. The formation of hydrazine sulfate was observed when hydrazoic acid was passed through concentrated sulfuric acid. (Author)

AD-404 779 Div. 4
(TISTM/EJH) OTS price $1.60

Stauffer Chemical Co., Richmond, Calif.
HIGH ENERGY OXIDIZERS.
Quarterly technical summary rept., 1 Feb-1 May 63,
by K. O. Christe and A. E. Pavlath. 1 May 63, 12p.
Contract Nonr401900, Proj. NR093 035
Unclassified report

Descriptors: *Complex compounds, *Chlorine compounds, *Fluorides, *Oxidizers, Boron compounds, Arsenic compounds, Antimony compounds, Chemical bonds, Vapor pressure, Nuclear magnetic resonance, Solvent action, Electrical conductance, Infrared spectroscopy, Optical materials, Corrosive liquids, Laboratory equipment.

The physical properties of the following three complexes were investigated: ClF3.BF3, ClF3.AsF5 and ClF3.SbF5. A vacuum line was built to handle ClF3 and its complexes safely with the exclusion of atmospheric moisture for vapor pressure determination, conductivity measurement and preparation of NMR samples. Vapor pressure measurements gave indication of strong bonding with AsF5 and SbF5 even at room temperature. With BF3 the complex was somewhat weaker. NMR investigations were conducted with these complexes in ClF3 as solvent. Indirect qualitative proof was obtained for the existence of the ionic structure. The results could not be evaluated quantitatively because of the rapid fluorine exchange between ClF3 and the complexes. A conductivity cell was designed for measuring the conductivity of the complexes in ClF3 as solvent In each case a .001 to .0001-fold increase was noted in the conductivity in a concentration less than 10 mol percent. A low temperature IR cell was designed. Sodium chloride windows were unsatisfactory for working with ClF3. IRTRAN-2 windows showed no corrosion. (Author)

AD-404 860 Div. 4, 14
(TISTM/EJH) OTS price $1.10

Scripta Technica, Inc., Washington, D. C.
ORGANOSILICON COMPOUNDS CONTAINING PHOSPHORUS (Kremiyorganicheskiye soedineniya, soderzhashchiye fosfor),
by M. A. Galashina, M. V. Sobolevskii, K. A. Andrianov and T. P. Alekseyeva. May 63, 9p.
BUSHIPS T817 Unclassified report

Descriptors: *Organic compounds, *Silanes, *Siloxanes, Phosphorus compounds, Silicon compounds, Condensation reactions, Molecular structure, Polymers, Stability, Heat resistant plastics, Synthesis (Chemistry).

A new monomer, diethylthiophosphatomethyldimethylethoxysilane, was obtained. The reaction of condensation of diethylthiophosphatomethyldimethylethoxysilane with alpha, omega-bis(dichloro)polydimethylsiloxanes was studied, and the possibility of synthesizing an oligomer of alpha, omega-bis(diethylthiophosphatomethyl) polydimethylsiloxanes was demonstrated. (Author)

AD-404 863 Div. 4, 25
(TISTM/TCG) OTS price $2.60

Monsanto Research Corp., Dayton, Ohio.
RADIATION POLYMERIZATION OF ACETYLENE DERIVATIVES.
Final rept. 2 Oct 62-2 Apr 63,
by M. E. Gutzke and W. H. Yanko. 26 Apr 63, 18p.
DA16
Contract NObs88166, Proj. R007 1101, Task 0554
Unclassified report

Descriptors: *Polymers, *Polymerization, *Organic compounds, Copolymerization, Chemical reactions, Stability, Semiconductors, Molecular weight, Solids, Electrical properties, Resistance (Electrical), Solubility, Colors, Radiation chemistry, Synthesis (Chemistry).

Research on the radiation-induced polymerization of acetylene derivatives to produce polyene polymers with useful properties was concerned with synthesis of acetylene derivatives, thermal, chemical and radiation-induced polymerizations and copolymerizations of selected acetylene derivatives, and characterization and evaluation of the prepared polymers. Diethynylbenzenes were prepared and used as crosslinking agents in these polymerizations to insure solid products. Radiation yields with G values (number of monomer molecules polymerized per 100 ev of absorbed radiation) greater than 100 were observed in the copolymerizations of p-diethynylbenzene/propiolic acid (296) and p-diethynylbenzene/dimethylethynylboronate (136) systems. Radiation yields for the polymerization and copolymerization of all other acetylene derivatives except propiolic acid were small and G values were less than 30. In general, the systems examined were thermally sensitive which necessitated low temperature radiolyses to determine radiation yields. Two polymeric systems, p-polyphenyl and polyferrocene, which should have long conjugated paths were prepared chemically and included in this study. (Author)

AD-404 892 Div. 4
(TISTM/AW) OTS price $3.60

Palermo U., Italy.
CONDUCTANCE OF SOME ALKALI HALIDES IN WATER-GLYCEROL MIXTURE AT 25 C.
Final technical rept., 1 Jan-31 Dec 62,
by Filippo Accascina. 31 Dec 62, 29p.
Contract DA91 591EUC2086
Unclassified report

Descriptors: *Electrolytes, *Electrical conductance, *Organic compounds, Sodium compounds, Chlorides, Viscosity, Mixtures, Water, Solutions, Solvents, Halides, Alkali metals, Organic compounds (Others).

The electrical conductance of sodium chloride in glycerol-water mixture has been measured at 25 C to test the validity of the Fuoss-Onsager theory in the case of a mixture with viscosity varying in a very large range. With the mixture used as a solvent, it is possible to vary the viscosity by a factor of a thousand. For all the mixtures the concentration method has been used. For the solution in pure glycerol the dilution method has been used due to the high viscosity. The results show that the sodium chloride is not associated up to the lowest dielectric constant corresponding to the pure glycerol. This evidence results from the plots of quantity versus c which are

linear for all the mixtures. The results have also permitted the analysis of the coefficient of the conductance equation in function of the viscosity of the medium. These coefficients, in the limit of the validity of the Walden rule, should depend only on the dielectric constant and not on the viscosity. In effect the results have confirmed this dependence. (Author)

AD-405 045 Div. 4
(TISTM/EJH) OTS price $1.25

Syracuse U., N. Y.
ABSTRACTION OF HALOGEN ATOMS BY METHYL RADICALS,
by M. Szwarc, F. W. Evans, R. J. Fox, M. Feld, and A. P. Stenfani. Mar 63, 35p.
Contract AF33 616 7662, Proj. 7367, Task 736701
ASD TDR63 273 Unclassified report

Report on The Chemistry and Physics of Materials.

Descriptors: *Organic compounds, *Halides, *Exchange reactions, *Reaction kinetics, *Dissociation, Halogenated hydrocarbons, Ions, Bromides, Chlorides, Fluorides, Iodides, Deuterated compounds, Heat of activation, Hydrogen, Deuterium, Tables, Experimental data, Fuel radicals, Thermochemistry, Solvent action, Photochemistry, Recombination reactions Organic compounds (Others), Chemical reactions

Halogen abstraction reactions, described by equation, RX + ·CH3 yields R· + XCH3 were investigated in solution for R = CH3, C2H5, iso-C3H7, t-C4H9, PhCH2, CH2Cl, CHCl2, CCl3 and CF3. Secondary deuterium effect was investigated for CH3 and CF3 addition reactions. Rate constants k sub 2I/k sub 1 and k sub 2Br/k sub 1 were found to be 45 and 3 x 10 to the 3rd power respectively, k sub 1 being the rate constant of the reaction PhCH2 + ·CH3 yields PhCH2· + CH4. The values of k sub 2I/k sub 1 and k sub 2Br/k sub 1 are compared with k sub 2H/k sub 1. The activation energies difference E sub 2I - E sub 1 was determined as - 1.8 Kcal/mole for the temperature range 55-85 C. (Author)

AD-405 115 Div. 4
(TISTM/EJH) OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
SEPARATION OF SOME LOW MOLECULAR WEIGHT FLUOROCARBONS BY GAS CHROMATOGRAPHY,
by S. A. Greene and F. M. Wachi. 20 Mar 63, 7p.
TDR169S53153 01TN2
Contract AF04 695 169
BSD TDR63 63 Unclassified report

Descriptors: *Chromatographic analysis, *Organic compounds, Halogenerated hydrocarbons, Separation, Liquids, Gases, Solids, Laboratory equipment, Mixtures, Molecular isomerism, Organic compounds (Others).

A gas-liquid chromatographic separation of some low molecular weight fluorocarbons is described. The separation has been effected at 0 C with a partially fluorinated acrylate as the liquid phase. As an adjunct to gas-liquid chromatography separation, separations were also carried out by gas-solid chromatography on a silica gel column under programmed temperature conditions. (Author)

AD-405 619 Div. 4, 14
(TISTM/ODN) OTS price $1.10

Armour Research Foundation, Chicago, Ill.
PREPARATION AND EVALUATION OF NEW HYDRAULIC FLUIDS.
Progress rept., 28 Feb-27 Mar 63,
by Irvine J. Solomon. 27 Mar 63, 9p. C6001 4
Contract NObs88249, Proj. C6001
Unclassified report

Descriptors: *Hydraulic fluids, *Sulfur compounds, *Organic compounds, Electrochemistry, Fluorination, Chlorides, Viscosity, Nuclear magnetic resonance, Silver compounds, Synthesis (Chemistry), Fluorides.

New fire-resistant hydraulic fluids based on fluorinated, sulfur-containing compounds are being developed. The compounds are being synthesized specifically to meet critical property requirements. Various derivatives of sulfur hexafluoride and other fluorinated materials are under investigation. The program consists of four phases: Simon's cell fluorinations, fluorinations with metallic fluorides, addition of sulfurchloride pentafluoride to olefins, and determination of physical and chemical properties. (Author)

AD-405 675 Div. 4
(TISTM/TCG) OTS price $2.60

Pennsylvania U., Philadelphia.
REVERSIBLE OXYGEN ELECTRODES.
Quarterly rept. no. 4, 1 Aug 62-31 Dec 62,
by A. Damjanovic, M. L. Bhaskara Rao, and M. Genshaw. 31 Dec 62, 26p.
Contract DA36 039sc88921, Task 3A99 09 001 02
Unclassified report

Descriptors: *Oxygen, *Adsorption, *Electrodes, Pressure, Electric potential, Sulfuric acid, Electrolytes, Electrochemistry, Heat, Electrolysis, Platinum.

Adsorption of oxygen on oxide-free platinum electrode was studied in pure 1 N H2SO4 solutions. Coverage of electrodes with oxygen was evaluated for various partial pressures of oxygen and temperatures. Heat of adsorption was obtained at different coverages. Dependence of rest potentials on coverage (and partial pressure) and on the temperature was determined. Preliminary work on the study of oxygen electrode reactions is described. (Author)

AD-405 677 Div. 4, 25
(TISTP/JW) OTS price $5.60

Sheffield U., Gt. Brit.
THE KINETICS OF EXCIMER FORMATION IN FLUID MEDIA
Final technical rept. no. 1, 1 Nov 61-31 Oct 62
by Brian Stevens. 31 Oct 62, 1v.
Contract DA91 591EUC2018
Unclassified report

Descriptors: *Fluorescence, Kinetic theory, Intensity, Excitation, Electron transitions, Fluids.

The observations of delayed fluorescence in the gas phase and in solution, together with the theories proposed to account for its origin and associated phenomena, are reviewed. (Author)

AD-405 692 Div. 4, 25
(TISTM/ODN) OTS price $1.60

Genoa U. (Italy).
DIFFUSION COEFFICIENT IN SOLID ARGON AND THERMOCONDUCTIVITY OF SOLID ARGON.
Final technical rept., 1 Mar 62-28 Feb 63,
by Giovanni Boato. 26 Mar 63, 19p.
Contract DA91 591EUC2151
Unclassified report

Continuation of Contract DA91 591EUC1721.

Descriptors: *Solidified gases, *Argon, *Diffusion, Thermal conductivity, Cryogenics, Laboratory equipment, Purification, Crystals.

Reliable values of the self-diffusion coefficient of solid argon were obtained. These values are in strong disagreement with those calculated from the activation state theory by others. The reasons for the disagreement are not yet understood. Thermoconductivity experiments are incomplete. (Author)

AD-405 817 Div. 4, 6
(TISTM/PCR) OTS price $1.60

Santa Barbara Research Center, Goleta, Calif.
PHYSICAL PROPERTIES OF LEAD SELENIDE FILMS.
Final rept.
23 May 63, 15p.
Contract NOw62 0925c

Unclassified report

Descriptors: *Selenides, *Films, Lead compounds, Detectors, Infrared detectors, Cryogenics, Tests, Hall effect, Stability, Gamma rays, Infrared radiation, Photoconductivity, Photoelectric materials, Life expectancy.

AD-405 859 Div. 4, 25
(TISTM/ODN) OTS price $1.60

RAND Corp., Santa Monica, Calif.
CONDITIONS FOR A HOMOGENEOUS MIXTURE TO BE IDEAL,
by N. Z. Shapiro. June 63, 11p. RM3677PR
Contract AF49 638 700

Unclassified report

Descriptors: *Mixtures, Chemical compounds, Chemical equilibrium, Mathematical analysis, Thermodynamics, Theory.

This report considers homogeneous mixtures of three or more chemical species, obtaining conditions for such mixtures to be 'ideal' over some range of chemical compositions. Temperature and pressure are assumed constant. Ideality is shown to derive from the assumption that for each species, the activity of the species depends only on the concentration of that particular species, independently of the concentrations of the other species. (Author)

AD-405 862 Div. 4, 14
(TISTM/EJH) OTS price $2.60

Naugatuck Chemical Div., United States Rubber Co., Conn.
SYNTHESIS OF REGULATED STRUCTURE POLYPHENYLETHER-SILOXANE BLOCK COPOLYMERS.
Quarterly progress rept. no. 7, 1 Feb-30 Apr 63,
by Robert MacFarlane, Jr. and Eugene S. Yankura.
30 Apr 63, 18p.
Contract DA19 020ORD5507

Unclassified report

Descriptors: *Heat-resistant plastics, *Silicone plastics, *Organic compounds, *Polymers, Polymerization, Copolymerization, Condensation reactions, Hydrolysis, Dehydration, Chromatographic analysis, Synthesis (Chemistry), Elastomers.

Condensation of 4,4'-dihydroxydiphenylether with dichlorosilanes has resulted in polymers of relatively high molecular weight. A crosslinking reaction occurred simultaneously precluding measurement of the exact degree of polymerization, but monomer purity has been shown to be of critical importance. A quarter-replicate factorial experiment to assess the effects of changes in temperature, reaction time, and reactant concentrations has been completed. Alkaline hydrolysis of 4,4'-dibromodiphenylether results in a mixture of as many as eleven different, organic compounds The experimental results point the way toward elimination of some of these compounds as by-products in the synthesis of 4,4'-dihydroxydiphenylether. It is possible to form 4,4'-dihydroxydiphenylether through intermolecular dehydration of hydroquinone. Hydroxy substituted polyphenylethers might also result from similar reactions. (Author)

5. COMMUNICATIONS

AD-404 712 Div. 5
(TISTE/CAM) OTS price $8.10

Litton Systems Inc., Waltham, Mass.
LINEAR SIGNAL PROCESSING THEORY AND MEASUREMENTS,
by Albert H. Nuttall. 30 Apr 63, 79p. TR63 2BF
Contract Nonr332000

Unclassified report

Descriptors: *Sonar signals, *Linear systems, *Underwater communication systems, Signals, Detection, Sonar receivers, Sonar sound analyzers, Theory, Mathematical analysis, Measurement, Signal-to-noise ratio, Attenuation, Narrowband, Time, Analysis, Communications theory, Processing.

A time-varying random linear system model is hypothesized for the communication medium. The fundamental parameters and analysis techniques for the linear system are described, and applied in a multiple alternative communication mode with Rayleigh fading. A comparison of several receiver types is then effected. Some measurement limitations and shortcomings are indicated. (Author)

AD-404 732 Div. 5, 28
(TISTP/MH) OTS price $7.60

Applied Psychological Services, Wayne, Pa.
INFORMATION TRANSFER IN DISPLAY-CONTROL SYSTEMS VII. SHORT COMPUTATIONAL METHODS FOR AND VALIDITY OF THE DEI TECHNIQUE.
Quarterly progress rept. no. 7, 16 Dec 62-15 Mar 63,
by Arthur I. Siegel, William Miehle and Philip Federman. 15 Mar 63, 71p.
Contract DA36 039sc87230, DA Proj. 3A95 20 001

Unclassified report

Descriptors: *Display systems, Applied psychology, Communication theory, Decision making, Human engineering, Design, Digital computers, Radar tracking, Radar targets, Radar equipment, Military psychology, Positioning reactions.

Several short methods for computing the Display Evaluative Index (DEI) are first described. The first method eliminates the requirements for calculating the values for the three factors comprising the DEI. Although the method does not generally provide an exact value for the DEI, it does provide an approximate value. The method is similar to linear extrapolation and is exact to the extent that the fractional changes of the variables involved are small. A second short computational method is presented which provides exact relative DEIs. This method uses fractional increments and is recommended for use in comput-

ing DEIs when: (1) only two or three variations of design are involved, and (2) the increments are known. The third method employs a digital computer for computing DEIs. The DEI was applied to several additional Signal Corps' systems and to hypothetical variations of these systems. The results of these applications again suggested that the technique possesses adequate evaluative sensitivity for distinguishing between various designs of the same system. A final validity study indicated that the DEI possesses adequate empirical validity. (Author)

AD-404 898 Div. 5, 6, 8, 26, 30
(TISTE/OHD) OTS price $19.75

RCA Service Co. Inc., Camden, N. J.
MAINTAINABILITY ENGINEERING.
Final rept.
5 Feb 63, 297p.
Contract AF30 602 2057, Proj. 5519, Task 551901
RADC TDR63 85, V2
Unclassified report

Descriptors: *Maintainability, *Maintenance, Design, Electrical engineering, Tests, Analysis, Statistical analysis, Electronic equipment, Theory.

This report, contained in two volumes, summarizes the final results achieved in the performance of the maintainability techniques study. The broad objective of this study was the formulation of a maintainability technology applicable to ground electronic systems. Volume II is a compilation of the analytical techniques and related maintainability information developed in the course of the study. Topics treated include: maintenance theory and classification, systems maintenance engineering, design guidelines, prediction technique, design review, demonstration testing, and field data acquisition. Collectively, this information forms a body of knowledge useful to the maintainability engineer. (Author)

AD-404 899 Div. 5, 6, 8, 26, 30
(TISTE/OHD) OTS price $10.50

RCA Service Co., Inc., Camden, N. J.
MAINTAINABILITY TECHNIQUE STUDY.
Final technical rept.
5 Feb 63, 125p.
Contract AF30 602 2057, Proj. 5519, Task 551901
RADC TDR63 85, v. 1 Unclassified report

Report on Phase 5.

Descriptors: *Maintainability, *Maintenance, Design, Ground support equipment, Reliability (Electronics), Electrical engineering, Analysis, Statistical analysis, Electronic equipment, Theory.

This report, contained in two volumes, summarizes the final results achieved in the performance of the maintainability techniques study. The broad objective of this study was the formulation of a maintainability technology applicable to ground electronic systems. Volume I, describes the investigations made to (1) identify factors affecting maintainability, (2) specify maintainability on a quantitative basis, (3) improve design of ground electronic equipment, (4) predict maintainability of electronic systems, and (5) derive trade-offs relating reliability, maintainability, and other system parameters. Particular emphasis is given to the fifth phase of study which was devoted to validation of the prediction technique and the investigation of the electronic maintenance proficiency test. The volume is concluded by noting the current status of maintainability technology and recommending areas for additional research. (Author)

AD-405 030 Div. 5
(TISTE/JWS) OTS price $4.60

International Electric Corp., Paramus, N. J.
TEST REPORT FOR ON-SITE ACCEPTANCE TESTS OF THE REMOTE COMMUNICATIONS CENTRAL AN/FYQ-4.
Final rept.,
by J. Farrell and J. J. Ritoch. 1 Mar 63, 44p.
TR51200A
Contract AF19 626 8
ESD TDR63 127 Unclassified report

Descriptors: *Telephone communication systems, *Telegraph systems, *Secret communication systems, *Communication equipment, Combat information centers, Data processing systems, Data storage systems, Modulators, Printing, Typewriters, Tests.

Test results, data, recommendations and conclusions for the Category I On-Site Acceptance Tests of the Remote Communication Central AN/FYQ-4 which were conducted at Amarillo, Texas on 29 and 30 October 1962, are presented. These tests comprise the first of a series of Category I tests to be performed at five selected RCC sites in accordance with AFR 80-14 Milestone No. 24 of the Strategic Air Command Control System (465L) Test Plan. This report serves to verify, to the satisfaction of IEC and the Air Force, the compliance of the Remote Communications Central (RCC) installed at Amarillo AFB, Amarillo, Texas, with the requirements of IEC TS 51200B 'First Article and Acceptance Test Specification for the Remote Communications Central AN/FYQ-4.' (Author)

AD-405 154 Div. 5, 6
(TISTE/JWS) OTS price $17.50

Purdue Research Foundation, LaFayette, Ind.
ADVANCED COMMUNICATION THEORY TECHNIQUES TECHNICAL DOCUMENTARY REPORT NO. ASD-TDR-63-186,
by J. C. Hancock, D. G. Lainiotis, J. C. Lindenlaub, R. G. Marquart and H. Schwarzlander.
Mar 63, 253p.
Contract AF33 657 7610, Proj. 4335, Task 433502
ASD TDR63 186 Unclassified report

Descriptors: *Radio communications systems, *Detectors, *Communication theory, Pulse communication systems, Errors, Coding, Simulation, Radio interference, Detection, Propagation, Attenuation, Ionospheric disturbances, Radiofrequency interference, Noise (Radio), Networks, Low frequency, Very low frequency, Medium frequency, High frequency, Very high frequency, Radio signals.

Radio wave channels are characterized by a model which accounts for both multiplicative and additive disturbances. A large amount of experimental data pertaining to radio disturbances is evaluated and correlated. The importance of the Rayleigh fading channel is emphasized and previous work is extended to determine the capacity and efficiency of the Rayleigh channel. Detection theory concepts were extended to treat the problem of signal detection in the presence of statistically unknown additive disturbances. Several detectors based on non-parametric statistical techniques are treated in detail. These detectors are compared to the conventional likelihood detectors. Design procedures are formulated. Signal design techniques are used to optimize transmitted waveforms, and the improvement in system performance is determined. The criterion used in this analysis is the minimization of intersymbol influence and the minimization of transmitter power for a fixed probability of received errors. The tradeoffs availa-

ble between transmitter power and coding complexity are thoroughly investigated for the binary symmetric channel. Results are obtained for both Hamming and Bose-Chandhuri codes. (Author)

AD-405 750 Div. 5, 8
(TISTE/OHD) OTS price $10.10

National Scientific Labs., Inc., Washington, D. C.
MONITORING SET, TELEPHONE AN/GTA-13 (XE-2) SERVICE TEST MODEL.
Final rept., 1 July 61-15 Mar 63,
by Francis E. Stimson. 15 Mar 63, 1v.
Contract DA36 039sc88911, Proj. 3B21 09 001
Unclassified report

Descriptors: *Telephone equipment, *Monitors, Transistor amplifiers, Electronic equipment, Circuits, Digital systems, Printed circuits, Switching circuits, Display systems, Recording systems.

The Monitoring Set, Telephone, AN/GTA-13, monitors any voice-frequency land line by means of a two-wire connection to a standard switchboard. As many as fifteen lines may be monitored simultaneously. Provision is made for automatic tape recorder control, and a seven-digit dialed number can be recorded and displayed. Electrical circuits are transistorized. A battery or ac power source may be used. A study made on the tentative breadboard design indicated a reliability which more than meets specifications. Details of basic system requirements, the reliability study, circuit design and development, and mechanical design features are described and discussed. Typical electrical performance data also are included. (Author)

6. DETECTION

AD-404 721 Div. 6
(TISTP/JEA) OTS price $1.60

System Development Corp., Santa Monica, Calif.
A SAGE LONG-RANGE-RADAR SIMULATION MODEL,
by R. L. Dugas. 15 Mar 63, 14p. TM1042 101 00
Unclassified report

Descriptors: *Radar tracking, *Models (Simulation), *Radar targets, *Programming (Computers) Mathematical models, Statistical functions, Controlled sequences, Radar echo areas, Scattering, Equations, Probability, Distribution, Sequences, Satellites (Artificial), Video signals, Antiaircraft defense systems, Air control centers, Data processing systems, Simulation, Radar range computers.

AD-404 798 Div. 6, 8
(TISTP/JEA) OTS price $8.10

White Sands Missile Range, N. Mex.
PRECISION SYNCHRONIZATION OF RADARS, PHASE I,
by Willis S. Parsons. May 63, 21p.
DA Proj. 1G2 50206D241
WSMR ERDA21 Unclassified report

Descriptors: *Radar equipment, *Synchronization (Electronics), *Oscillators, *Microwave networks, Crystal oscillators, Electron beams, Cesium, Rubidium, Calibration, Frequency stabilizers, Gates (Circuits), Time, Analysis, Radar pulses, Radar range calibrators, Atomic properties.

A method of synchronizing radar systems by use of atomic oscillators is discussed. Synchronization will be accomplished by use of these oscillators and the microwave system of the synchronized radars. The laboratory analysis of the oscillators used is also discussed. (Author)

AD-404 889 Div. 6, 22
(TISTP/JEA) OTS price $3.60

Jansky and Bailey Div., Atlantic Research Corp., Washington, D. C.
ELECTROMAGNETIC COUPLING TO ORDNANCE SYSTEMS.
Final rept.
31 Dec 62, 29p.
Contract N178 7921
Unclassified report

Descriptors: *Electromagnetic properties, *Ships, *Electromagnetic shielding, *Electric igniters, Numerical methods and procedures, Naval vessels (Combatant), Statistical functions, Explosives initiators, Hazards, Wave transmission, Radiofrequency, Electromagnetic waves, Radio transmitters, Antennas, Analysis, Electromagnetic fields.

Research was concerned with the procedure for analyzing the transmission of energy from electromagnetic radiators to electrically initiated devices of ordnance systems. Techniques of measurement and problem areas were discussed. A method was presented for examining the spatial perturbations of an electromagnetic field aboard ship. The deviations of the field strength from an unperturbed, free-space field were examined as a statistical function. (Author)

AD-404 912 Div. 6, 8, 25, 14
(TISTE/OHD) OTS price $1.00

Institute of Science and Tech., U. of Michigan, Ann Arbor.
DEVELOPMENT OF A FAST SOLID-STATE ULTRAVIOLET PHOTODETECTOR.
Final rept., June 61-Aug 61,
by Douglas E. Brown, Richard C. Keezer, and Joseph Mudar. Mar 63, 33p. 4611 13F
Contract AF33 616 8410, Proj. 4460, Task 446004
ASD TDR62 978 Unclassified report

Descriptors: *Ultraviolet detectors, *Semiconductor devices, Resistance (Electrical), Photoelectric materials, Sensitivity, Zinc compounds, Sulfides, Titanium compounds, Dioxides, Magnesium compounds, Oxides, Electric currents, Solid state physics, Optical equipment, Spectra (Visible and ultraviolet), Ultraviolet optical materials.

The objective of this work was to develop a fast solid-state ultraviolet detector. Efforts were concentrated on photovoltaic devices using metal semiconductor barrier layers. Peak detectivities of the order of 10 to the 9th cm (cps to the half power) watt and tine constants of less than 120 microsec were achieved with both ZnS (lambda peak = 339 millimicron) and TiO2 (lambda peak = 320 millimicron). MgO was found to be photoconductive when exposed to radiation of wavelength less than 260 millimicron. Trapping states in TiO2 were investigated by means of the method of space charge-limited currents. (Author).

AD-405 769 Div. 6, 25
(TISTE/CAM) OTS price $7.60

Military Physics Research Lab., U. of Texas, Austin.
THE PHOTOELECTRIC ROTATING SLIT ELEVATION AND AZIMUTH SENSOR (PERSEAS),

by Herman E. Brown and Mark D. Glasgow. Mar 63, 67p. MPRL552
Contract AF08 635 2631, AFSC Proj. 7844
ASD TDR63 16 Unclassified report

Descriptors: *Optical equipment, *Photoelectric effect, *Azimuth, *Light, Feasibility studies, Experimental data, Angle of arrival, Photoconductivity, Photomultipliers, Photosensitivity, Lenses, Focusing, Detection, Optical images, Measurement, Rotation.

A description is presented of a laboratory experimental study of two optical sensing devices which appeared to be worthy of feasibility studies for the specific development of scoring devices. The first device, known as the Photopot System, did not prove feasible as a useful sensor. The second device, known as PERSEAS is considered appropriate for further development. Studies have shown that PERSEAS is highly accurate for the measurement of relative azimuth and elevation angles, and studies of the concept have so far revealed no major limitation which would prevent development of a complete scoring system. (Author)

7. ELECTRICAL EQUIPMENT

AD-404 768 Div. 7
(TISTP/WH) OTS price $1.60

Boeing Co., Seattle Wash.
HARDENED INTERSITE CABLE TO ESA STUB CABLE SPLICING-WING V, FIGURE A 1373 AND 1374,
by R. E. McLean. 1963, 14p. D2 14349
Contract AF04 694 107
Unclassified report

Descriptors: *Electric wire, *Cables.

AD-404 781 Div. 7
(TISTE/JWS) OTS price $5.60

General Electric Co., West Lynn, Mass.
RESEARCH AND DEVELOPMENT OF MATERIALS AND FABRICATION TECHNIQUES FOR THERMOELECTRIC POWER GENERATION.
Quarterly progress rept. no. 3, 1 Aug-30 Oct 62. 30 Jan 63, 55p.
Contract NObs86854, Proj. SR007 12 01, Task 802
Unclassified report

Descriptors: *Thermoelectric converters, Life expectancy, Tests, Soldering, Soldering fluxes, Lead alloys, Tellurides, Brazing, Welding, Test equipment, Bonding, Manufacturing methods.

Life test data to 2000 hours of operation with temperature cycling were obtained. Agreement with the predicted power level is considered excellent, but significant problems remain. Our solution to these problems along with test data is presented. A study was completed to determine the optimized cartridge configuration. Many improvements in design were made possible from experience obtained from test and fabrication problems encountered in the original design. Junction electrical resistance are reduced by techniques described. It is believed that the greatest significant attainment exists in the solution to the junction problem. (Author)

AD-404 841 Div. 7
(TISTM/PCR) OTS price $2.60

Calvin Coll., Grand Rapids, Mich.
HIGH RATE CYCLING BEHAVIOR OF THE SILVER ELECTRODE,
by Thedford P. Dirkse. 1 Apr 63, 24p. TR15
Contract Nonr168201, Proj. NR359 364
Unclassified report

Descriptors: *Electrodes, Alkaline cells, Zinc, Storage batteries, Cadmium, Cadmium compounds, Battery compartments, Battery separators, Acrylic resins, Oxides, Temperature, Silver compounds, Pressure, Adsorption, Oxygen, Battery chargers, Circuits, Silver.

A study was made of the behavior of the silver electrode when it is cycled at high current rates in alkaline solutions. The ratio of charge to discharge capacity was measured at room temperature. An explanation is suggested for the inefficiency that is observed. (Author)

AD-405 481 Div. 7, 14
(TISTM/AMS) OTS price $9.60

Allison Div. General Motors Corp., Indianapolis, Ind.
RESEARCH AND DEVELOPMENT OF AN ADVANCED LABORATORY LIQUID METAL REGENERATIVE FUEL CELL.
Quarterly technical progress rept. no. 1, 1 Mar-18 May 63,
by H. R. Karas and J. D. Mangus. 28 May 63, 1v. EDR 3344
Contract AF33 657 11032, Proj. 8173, Task 817303
Unclassified report

Descriptors: *Fuel cells, *Liquid metals, *Ceramic materials, Laboratory equipment, Tests, Seals (Stoppers), Electrolytes, Mercury, Potassium, Tensile properties, Compressive properties, Rupture, Pressure, Temperature, Porous materials, Resistance (Electrical), Electrical conductance, Density, Powders, Test methods, Oxides, Performance tests, Thorium compounds, Impact shock, Thermal insulation, Aluminum compounds, Nickel alloys, Cobalt alloys, Iron alloys, Spinels, Magnesium compounds.

Work is under way to design a laboratory-type cell for operation with a matrix. Tests are in progress to determine matrix compatibility with electrolyte; optimization of mechanical and electrical properties of the matrix are progressing. A successful 96-hour seal was produced, although insulators were cracked and electrolyte seepage occurred. A preliminary check of electrochemical properties yielded encouraging results, predicting performance in the 50- to 100-watt/sq. ft. range. (Author)

AD-405 571 Div. 7
(TISTM/TCG) OTS price $1.50

Texas Instruments, Inc., Dallas.
MOLTEN-CARBONATE FUEL BATTERY PROGRAM,
Quarterly progress rept., 15 Feb-15 May 63. 15 May 63, 51p. 08 63 63
Contract DA44 009AMC54
Unclassified report

Descriptors: *Fuel cells, *Electrolytes, *Carbonates, *Additives, Electrolytic cells, Power supplies, Hydrogen, Carbon dioxide, Sulfides, Molybdates, Chromates, Tungstates, Hydrocarbons, Lithium compounds, Eutectics, Electrodes, Manufacturing methods, Silver, Electric potential, Polarization, Batteries & components, Liquids, Sodium compounds.

Power obtainable from single cells on hydrogen fuel using the 4 3/16 in. electrode diameter assembly was increased from an average of 60 to 100 w/sq ft at 0.7 v by improvements in the fuel electrode structure and reduction in electrical resistance. These cells produce approximately 60 w/sq ft at 0.5 v on a fuel composed of 50:50 H and CO2; cells have operated for more than 1000 hrs. A concentration of 0.2 mole percent of H2S in the fuel gas was not detrimental in a 1000 hr test. A 100-w battery design has been constructed. A laboratory model of the JP-4 - air partial oxidation unit has produced 12.5 cu ft/hr of a gas stream containing 50-60% gaseous fuel (mostly H and CO), 35-40% N, and 5-10% CO2. This unit has been operated for 78 continuous hrs. A cell has been operated directly on the gaseous product. Additives for the molten-carbonate electrolyte were screened, (Na2MoO4, Na2CrO4, Na2WO4, Na2S, and Na2ZnO2). Only sodium sulfide was observed to have a significant positive effect on cell power output. (Author)

AD-405 621 Div. 7, 17, 25
(TISTM/PCR) OTS price $5.60

Servomechanisms, Inc., Goleta, Calif.
(No title).
Final rept.
July 62, 51p.
Contract NObs86367, Proj. SR007 12 01
Unclassified report

Descriptors: *Thermoelectricity, Encapsulation, Tests, Pressure, Thermal stresses, Shock (Mechanics), Fracture (Mechanics), Thermal expansion, Materials, Lead compounds, Tellurides, Semiconductors, Life expectancy, Compatibility, Sintering, Heat treatment, Compressive properties, Design, Manufacturing methods.

A study was made of one method of thermoelectric application technique. Specifically, the work involved fabrication and test to investigate a method of structural encapsulation of washer-shaped thermoelectric elements under pressure. One goal of the program was to verify preliminary evidence that thermoelectric elements are free from formation of mechanical cracks due to thermal shock, high thermal gradients, or thermal expansion problems when the thermoelectric material is held beyond its compressive yield strength. Thus, short path-length elements may be used with high thermal gradients, resulting in high electrical yield per kilogram of thermoelectric material with low degradation over long operating life. (Author)

AD-405 829 Div. 7, 12, 25
(TISTE/OHD) OTS price $4.40

Westinghouse Electric Corp., Pittsburgh, Pa.
SUPERCONDUCTING MAGNET RESEARCH AND APPLICATION TO MHD POWER GENERATORS.
Interim scientific rept. no. 1, 1 Feb-30 Apr 63.
10 May 63, 45p.
Contract AF33 657 10567
Unclassified report

Descriptors: *Magnetohydrodynamics, *Generators, *Electromagnets, Superconductivity, Cooling, Theory, Lithium, Electric power production, Mathematical analysis, Superconductors.

An investigation was undertaken of the recently developed superconducting magnets and their application to MHD power generators for space use. The work includes theoretical analysis of an MHD generator with particular emphasis on the magnetic field requirements and a study of the problems of superconducting magnet design to fulfill these requirements. To attain this end, models of a superconducting magnet, cooling equipment and an MHD generator are analyzed. The total power system including a reactor heat source and radiator is then optimized on a power-to-weight basis to find the optimum magnetic field. With this completed, a comparison is made between superconducting magnets and conventional magnets to illustrate the advantages or disadvantages of both. (Author)

AD-405 871 Div. 7, 26
(TISTE/JWS) OTS price $3.60

Rome Air Development Center, Griffiss Air Force Base, N. Y.
THE RELIABILITY ANALYSIS OF NONELECTRONIC COMPONENTS,
by Donald W. Fulton. Mar 63, 29p.
Proj. 5519, Task 551902
RAS TM63 2
Unclassified report

Descriptors: *Electrical equipment, *Mechanical properties, *Mathematical prediction, Failure (Mechanics), Stresses, Electric switches, Fatigue (Mechanics), Mathematical models, Life expectancy, Tests, Reliability.

The approach to the reliability prediction of nonelectronic parts can best be served by basing the technique on the mechanisms of failure. This can be brought about by transforming deterministic models relating to these mechanisms into probabilistic time domain models. Five techniques are presented: (1) The establishment of a failure data collection and analysis system specifically for nonelectronic parts. This would over-come the present lack of empirical data; (2) Institute further investigations into the damage resulting from the progression of critical failure inducing mechanisms as a function of stress versus time; (3) Institute studies in the area of the synergistic and/or inhibiting effects resulting from combinations of stress; (4) The development of efficient means for the generation empirical failure data and verification of predictions; and (5) The development of unifying laws to explain the interrelationships among the entire spectrum of failure mechanisms. (Author)

8. ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-404 708 Div. 8
(TISTE/CAM) OTS price $1.60

Radiation, Inc., Palo Alto, Calif.
SUPER-POWER KLYSTRON TUBE-TEST FACILITY.
Quarterly rept. no. 9, 1 Oct-31 Dec 62,
by R. L. Blessing. 1 Mar 63, 17p. G108 Q9
Unclassified report

Subcontract to Varian Associates, Palo Alto, Calif.

Descriptors: *Klystrons, *Test facilities, Radiofrequency power, Electric potential, Magnets, Resistors, Capacitors, Anodes (Electron tubes), Modulation, Test equipment (Electronics), Power supplies, Electromagnetic pulses, Transformers (Electronics).

During this quarter, equipment installation and interconnection was completed with the exception of the crowbar. The interim modulator tests were completed, and the modulator was delivered and interconnected with the remainder of the system. All system interconnection wiring and piping were completed and tested. The beam supply tests were completed into a dc dummy load and this portion of the system performed satisfactorily. The bias supply, resistors, bushings and covers associated with the klystron/modulator tank were installed and tested. The crowbar fabrication was completed and preliminary tests are being conducted. (Author)

AD-404 714 Div. 8
(TISTE/CAM) OTS price $4.60

Technische Hochschule, Munich (Germany).
ANTENNA WITH TUNNEL DIODE,
by H. H. Meinke. 31 Mar 63, 47p. TR3
Contract AF61 052 506
Unclassified report

Original contains color plates: All DDC reproductions will be in black and white. Original may be seen in DDC Hq.

Descriptors: *Dipole antennas, *Tunnel diodes, Negative resistance circuits, Electrical impedance, Electrical conductance, Capacitance, Stability, Measurement, Electric potential, Electrical networks, Differential equations, Mathematical analysis, Alternating current, Direct currents.

Presented are the effects of a combination consisting of an antenna and tunnel diodes. This is a first report explaining some fundamental rules in respect to the application of tunnel diodes with antennas; also the corresponding impedance measurement techniques are described. Part I of this treatment is primarily concerned with the stability problems involved in avoiding self-excitation phenomena within the system. Part II discusses the basic questions concerning the measurement of input impedance. A folded unipole with a tunnel diode at the top of the radiator is studied experimentally as an example. The measurement of impedances with negative resistances by using slotted line techniques is also described. (Author)

AD-404 737 Div. 8, 7
(TISTE/PAR) OTS price $2.60

Bliely Electric Co., Erie, Pa.
PRODUCTION ENGINEERING MEASURE: QUARTZ CRYSTAL UNITS CR-(XM-45)/U (HIGH SHOCK AND VIBRATION RESISTANT, LOW FREQUENCY).
Quarterly progress rept. no. 3, 1 Dec 62-28 Feb 63,
by J. M. Wolfskill, A. R. Krespan, and Robert Mouck. 28 Feb 63, 29p.
Contract DA36 039sc86719
Unclassified report

Descriptors: *Quartz, *Crystal filters, Shock (Mechanics), Vibration, Low frequency, Temperature, Tests, Test methods, Military requirements, Crystal structures, Crystal filters, Crystal holders, Capacitance, Resistance (Electrical), Crystals, Manufacturing methods.

Development of high shock and vibration resistant low frequency quartz crystal units was continued. The CR-(XM-45)/U crystal units are similar to standard CR-42A/U units except that the new units must withstand much more severe vibration and must also hold much tighter frequency stability over the +70 C to +80 C operating temperature range (OTR). This report presents evaluation data from the second group of experimental units prepared for this project. They gave indications that the new experimental design -- which uses special, double-rotated X cut resonators mounted in Bliley's ceramic-frame holders -- can be refined to meet the CR-(XM-45)/U requirements, provided an increase of 3.5 uuf is made in the specified capacitance values. Attention is now concentrated on improving the temperature characteristics of the new resonators. Increases in the second rotation angle have no significant changes in peaking points but there are indications that improved drift over the OTR can be obtained by proper placement of the support wires on the crystals. (Author)

AD-404 783 Div. 8
(TISTE/CAM) OTS price $9.10

Goodyear Aircraft Corp., Akron, Ohio.
ADVANCED ANTENNA DESIGN TECHNIQUES.
Quarterly progress rept. no. 3, 16 Dec 62-28 Feb 63,
by D. D. Collins and J. C. Bell, Jr. 28 Mar 63, 95p. 11045; 3
Contract DA36 039sc90746, DA Proj. 3A99 12 001
Unclassified report

Descriptors: *Satellite antennas, *Parabolic antennas, *Radar antennas, Feasibility studies, Model tests, Electrical properties, Mechanical properties, Antenna fields, Antenna lobes, Reflectors, Deflection, Analysis, Design, Tracking, Satellites (Artificial).

Study and analysis for the advanced antenna design techniques were continued. The rigid-panel swirlabola space vehicle antenna, paraboloid ground-based antenna, and the lenticular ground-based antenna, selected as having the best potential, are studied and analyzed in detail. Detail design configurations for models of these three antennas are established. (Author)

AD-404 801 Div. 8, 25
(TISTE/CAM) OTS price $8.10

Microwave Lab., Stanford U., Calif.
MULTIMEGAWATT BROADBAND MICROWAVE TUBES AND RELATED STUDIES.
Annual rept. no. 1, 1 Sep 61-31 Oct 62, Dec 62, 81p.
Contract AF30 602 2575, Proj. 5573, Task 557303
RADC TDR62 618 Unclassified report

Descriptors: *Traveling wave tubes, *Electron guns, *Klystrons, *Electron beams, *Microwave

amplifiers, Radiofrequency power, Propagation, Attenuation, Waveguides, Waveguide slots, Coupling circuits, Cavity resonators, Microwave oscillators, Cesium, Circuits, Microwave network, Dielectrics, Theory, Design, Magnetic fields, Plasma physics.

Contents:
Long slot traveling wave tube
Electron stick
Hollow beam electron guns
Extended interaction klystrons
Fast wave tubes
Electron beam interaction with a cesium plasma

AD-404 807 Div. 8
(TISTE/OHD) OTS price $2.60

Rome Air Development Center, Griffiss Air Force Base, N. Y.
STATISTICAL DESIGN TECHNIQUES,
by Jerome Klion. May 63, 15p.
Proj. 5519, Task 551902
RADC RAS TM63 3
Unclassified report

Descriptors: *Reliability (Electronics), *Statistical analysis, Computers, Design.

It is the purpose of this discussion to trace the development of the application of statistical techniques from their first simple fundamentals to the sophisticated procedures which are being investigated for near future application. Prior to starting on any discourse perhaps it should be mentioned that many papers, reports, etc., especially of the type which are for the most part non-computer oriented, are in general based upon similar concepts although each individual paper or report differs from any other in various particulars and areas of emphasis. Also since the progress of statistical design will be discussed from its first serious development - to its contemporary stage - to its near future stage, this report is divided into three sections. The fact that there are three definable stages in statistical design is evident from a study of the literature (Author)

AD-404 822 Div. 8, 7
(TISTE/PAR) OTS price $2.60

Piezo Crystal Co., Carlisle, Pa.
PRODUCTION ENGINEERING MEASURE: FUNDAMENTAL MODE CRYSTAL FOR FILTERS CR(XM-41)/U.
Quarterly rept. no. 6, 10 Aug-9 Dec 62.
9 Dec 62, 27p.
Contract DA36 039sc85956
Unclassified report

Original contains color plates; all DDC reproductions will be in black and white. Original may be seen in DDC Hq.

Descriptors: *Quartz, *Crystal filters, High frequency, Temperature, Tests, Aging (Materials), Production, Test methods, Military requirements, Crystal structure, Material removal, Machining, X-ray diffraction analysis, Shock (Mechanics), Vibration, Filters, Electromagnetic waves, Crystals, Manufacturing methods.

Work was continued on the production engineering measurement of fundamental mode filter type crystals CR(XM-41)/U in the 10-30 mc frequency range. During the processing and testing of the 30 mc filter type crystals, about 60% of the cultured quartz units were going out of frequency tolerance during the temperature test. Units of natural quartz manufactured along with cultured quartz remained in tolerances during the temperature run. Investigation revealed that cultured quartz does not have the same temperature coefficient after grinding due to apparent angular shift when crystals have a large amount of quartz removed by grinding. A final design for filter blanks was derived and the preproduction samples were submitted for test. (Author)

AD-404 857 Div. 8
(TISTE/CAM) OTS price $1.10

Autonetics, Downey, Calif.
MICROMINIATURE CIRCUITRY GLOSSARY TERMS AND DEFINITIONS,
by F. Iannone. Dec 62, 12p.
Unclassified report

Descriptors: *Microminiaturization (Electronics), Vocabulary, Standards, Dictionaries.

This glossary is an initial compilation of the numerous terms and definitions in the field of microminiature circuitry. Its purpose is to establish a common basis for communication and to eliminate the confusion resulting from the various interpretations in current usage. (Author)

AD-404 868 Div. 8
(TISTE/PAR) OTS price $1.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
70 GC KLYSTRON FREQUENCY STABILITY AND SPECTRUM,
by John E. Kammerer and Cecil L. Wilson. Mar 63, 21p.
Proj. 1M222901A215
BRL MR1457 Unclassified report

Descriptors: *Klystrons, *Reflex klystrons, Extremely high frequency, V band, Measurements, Voltage regulators, Sensitivity, Crystal mixers, Test equipment (Electrons), Frequency analyzers, Frequency meters, Frequency stabilizers, Intermediate frequency amplifiers, Microwave oscillators, Test methods, Test sets, Tests, Voltmeters, Waveguides, Spectrum analyzers, Bandwidth, Stability, Frequency shift.

Measurements were made of the frequency stability of V-band reflex klystrons while being operated from regulated voltage sources of different stability. A. C. line regulators and two different types of power supplies were used; one with a voltage regulation of 0.03%, and the other with a voltage regulation of 0.001%. Relative frequency stability was determined by mixing the outputs of two klystrons whose frequencies differed by approximately 60 mc. This difference frequency was then amplified, counted on a high-frequency counter, and observed on a panoramic receiver. (Author)

AD-404 882 Div. 8
(TISTM/PCR) OTS price $8.60

Kane Engineering Labs., Palo Alto, Calif.
CONTINUATION OF AN ADVANCED KLYSTRON STUDY.
Final rept.,
by J. F. Kane and R. N. Wilson. Apr 63, 91p.
Contract AF30 602 2423, Proj. 5573, Task 557303
RADC TDR63 151 Unclassified report

Descriptors: *Klystrons, Mathematical models, Mathematical analysis, Design, Microwave amplifiers, Cavity resonators, Broadband, Matrix algebra, Integral equations, Theory, Perturbation theory, Statistical mechanics, Beams (Electromagnetic), Mathematical prediction.

Matrix methods are used in an attempt to clarify the predictions of many resonator klystron response at frequencies above the pass band. The gain expressions have been expressed in factored form in the case of staggered tuning but numerical calculations in the super pass band region have not been completed due to computational length and complexity. Several subjects in large-signal beam theory are treated. The multigap problem is formulated in terms of an integral equation which is solved within the framework of second order perturbation theory. The disc-model of space-charge forces is used to derive a large-signal equation of motion for a finite diameter beam. Solutions to the equation indicate different space charge reduction factors for each harmonic of the modulating voltage. Statistical mechanical methods are used to derive equations of motion corresponding to the infinite beam model. Terms appear which cast doubt on the infinite beam model near crossover. The new terms are simulated by the introduction of phenomenological collision loss terms which impede the onset of crossover. (Author)

AD-404 893 Div. 8
(TISTP/FR) OTS price $4.60

Army Electronics Research and Development Lab., Fort Monmouth, N. J.
DESIGN AND EVALUATION OF THERMOELECTRIC THERMAL BARRIER FOR MICRO-MODULES,
by Robert D. FitzGerald and Herbert C. Frankel. Sep 62, 37p.
DA Task 3A99 15 002 03
USAELRDL TR2308
Unclassified report

Descriptors: *Thermoelectricity, Cooling, Heat transfer, Temperature, Miniature electronic equipment.

Use of a specific Peltier temperature control device, called a 'thermoelectric thermal barrier, to protect heat-sensitive electronic circuit elements from closely associated heat-producing elements in a microelectronic assembly is discussed. Test results on a simulated binary divider micro-module indicate the feasibility of the thermoelectric thermal barrier approach. Experimental results with a simulated micro-module operating at temperatures between 25 C and 95 C indicate that it is possible under certain circumstances to protect a heat-sensitive element from a heat-generating element within the same micro-module by means of a small, low current Peltier device built directly into the micro-module between these elements. (Author)

AD-404 897 Div. 8
(TISTP/FEM) OTS price $12.50

Saarbrucken U. (Germany).
SOME PROBLEMS IN THE THEORY OF DIFFRACTION AND REFRACTION IN STRATIFIED MEDIA,
by Gottfried Eckart and Hubert Martin. 1962, 176p.
Contract DA91 591EUC2087
Unclassified report

Descriptors: *Wave transmission, *Diffraction, Electromagnetic waves, Refraction, Probability, Reflection, Vector analysis, Transformations (Mathematics), Special functions, Distortion, Attenuation, Integral equations, Tables, Partial differential equations, Theory.

Problems arising in the theory of wave propagation in stratified media are discussed. The stratification is supposed as being continuous in some partial questions or discontinuous in other ones. The problems in question are diffraction problems in a strong relation to refraction. (Author)

AD-405 028 Div. 8, 5
(TISTE/JWS) OTS price $6.60

Carlyle Barton Lab., Johns Hopkins U., Baltimore, Md.
REPRESENTATION AND DETECTION OF MULTIPLE-EPOCH SIGNALS,
by Tzay Y. Young. May 63, 11p.
Contract AF30 602 2597, Proj. 4505, Task 450501
RADC TDR63 142
Unclassified report

Descriptors: *Radio signals, *Radio interference, Digital computers, Statistical functions, Correlation techniques, Detection, Special functions (Mathematics), Filters (Electromagnetic wave).

A multiple-epoch signal consists of several signals which for one reason or another, overlap one another. The purpose of this report is to design a procedure for the detection of the individual epochs of the overlapping signals and to represent them properly. The multiple-epoch signal may be corrupted with random Gaussian noise of zero mean. The individual signals are assumed to be representable by a set of exponential functions with acceptable error, and the exponents of this set of exponentials are assumed known. Any two adjacent epochs are assumed to be separated at least two seconds apart. For the signal uncorrupted with noise a criterion based on the error energy is described which is of theoretical interest. This criterion is useful for the detection of first epoch only. To detect the second epoch, the first signal is subtracted from the original signal by means of the complementary operator concept. For a noisy signal, a likelihood ratio criterion is proposed. The preliminary experimental results carried out on a digital computer justify the theoretical study. (Author)

AD-405 029 Div. 8, 14, 26
(TISTM/PCR) OTS price $1.60

Stanford Research Inst., Menlo Park, Calif.
BETA-SILICON CARBIDE AND ITS POTENTIAL FOR DEVICES,
Quarterly technical rept. no. 5, 1 Feb-30 Apr 63, by W. E. Nelson and F. A. Halden. 15 May 63, 12p. 15
Contract NObsr87235, Proj. SR0080303, Task 9356
Unclassified report

Descriptors: *Carbides, *Crystal growth, *Semiconductor devices, Diodes, Manufacturing methods, Crystals, Impurities, Nitrogen, Resistance (Electrical), Silicon, Melting, Aluminum, Boron, Gold, Soldering, Wire, Hall effect, Colors, Silicon compounds.

P-type crystals were grown using boron and aluminum additions to the silicon melts. Some difficulty arose as a result of compensation by impurities in the boron employed, but doping levels obtained using aluminum additions appeared quite uniform and amenable to control. Satisfactory results are anticipated for boron when higher purity, zone-refined rod form is used. Ohmic contacts were obtained on low resistivity (0.1 to 1.0 ohm-cm) n-type silicon carbide by soldering gold wires directly to the crystals. A number of crystals were prepared for Hall measurements (five-contact method) using this technique. For high resistivity silicon carbide, ohmic contacts were prepared by flash-fusing carbon-saturated silicon on the crystal surfaces in an arc-image furnace. Rectifying contacts were prepared by this technique using carbon-free silicon of the proper conductivity type. Simple diodes were

produced from p-type beta-silicon carbide crystals. Intense light was observed at the emitting junction when some of these diodes were being tested. (Author)

AD-405 042 Div. 8
(TISTE/JWS) OTS price $5.60

Magnavox Co., Fort Wayne, Ind.
QUARTZ CRYSTAL OSCILLATOR CIRCUITS STUDY.
Quarterly rept. no. 1, 1 Sep-30 Nov 62,
by D. Firth. 15 Apr 63, 47p.
Contract DA36 039AMC00043, Proj. 3A99 15 004
Unclassified report

Descriptors: *Crystal oscillators, *Circuits, Very low frequency, Low frequency, Medium frequency, High frequency, Very high frequency, Radio frequency, Radio frequency oscillators, Electron tubes, Transistors, Quartz resonators, Temperature, Gain, Phase shifters, Handbooks.

The format of the quartz crystal oscillator design handbook that will be the end result of this program is discussed; the approach taken and the reasoning behind this approach are also discussed. The major factors influencing LC oscillator operation is briefly analyzed. This discussion will be the introductory section of the handbook. Material to be included in that section of the handbook concerned with quartz crystal characteristics includes: the limiting of crystal operation by the capacitance across the crystal, the limiting conditions of crystal operation when used in conjunction with a series capacitor, and an analysis of the operation of a pi network using a quartz crystal as the inductive element. (Author)

AD-405 044 Div. 8, 30
(TISTE/JWS) OTS price $2.60

Air Force Cambridge Research Labs., Bedford, Mass.
PRECISION TIME OR FREQUENCY TRANSMISSION TO MOVING VEHICLES,
by Richard M. Waetjen. Apr 63, 19p.
AFCRL 63 93
Unclassified report

Descriptors: *Phase locked communication systems, *Doppler effect, *Spacecraft, Frequency shift, Mixers (Electronic), Oscillators, Timing devices, Acceleration, Timing circuits.

A circuit is described which is capable of transmitting the output of an ultra-stable oscillator or clock with an extremely high degree of accuracy to a moving vehicle. First-order Doppler frequency shift of the form fv/c, as caused by the velocity of the vehicle relative to the transmitting station, is cancelled, while second-order Doppler is largely eliminated. Because of these features, the circuit makes application of very stable frequency sources to vehicle electronic systems possible to degrees of stability which could previously not be achieved or even approached by several orders of magnitude. Applications of the circuit include radio navigation, guidance, and tracking, as well as data transmission, telemetry, and possibly communications involving earth satellites, moon satellites, and interplanetary and other space vehicles. (Author)

AD-405 053 Div. 8
(TISTP/FR) OTS price $4.60

Cruft Lab., Harvard U., Cambridge, Mass.
CONDITIONS FOR OPTIMUM DIGITAL COMMUNICATION WITH APPLICATION TO DELTA MODULATION,
by Terrence Fine. 5 Mar 63, 39p. TR399
Contract Nonr186616, Proj. NR372 012
Unclassified report

Descriptors: *Communication systems, Digital systems, Pulse modulation, Communication theory, Simulation.

A procedure for optimization of a class of binary communication systems is presented and applied. The message set or transmitter input is taken to be a real-valued sample sequence from a stochastic process with discrete parameter. The transmitter may be any time-varying, nonlinear operator with domain of the real valued input and range to the binary numbers. The transmission medium of noisy channel linking the transmitter and receiver is to be characterized by the conditional probabilities of all possible received binary sequences given any transmitted sequence. The receiver may be any real-valued, time-varying, nonlinear operator on the received binary sequences. The optimization conditions obtained are discussed and the relationship between an optimum communication system and a delta modulation system indicated. It is shown that, for the quadratic loss function and any noisy channel, a delta modulation system is an allowable representation of the optimum binary system. Preliminary results on an extended digital communication system model are discussed and areas for further research are indicated. (Author)

AD-405 055 Div. 8, 30
(TISTM/PCR) OTS price $1.25

Cruft Lab., Harvard U., Cambridge, Mass.
A 21-CENTIMETER TRAVELING-WAVE MASER,
by E. B. Treacy. 22 Jan 63, 28p. TR401
Contract Nonr186628 Proj. NR372 013
Unclassified report

Descriptors: *Masers, *Radio astronomy, Ruby, Line spectrum, Traveling wave tubes, Theory, Specifications, Magnets, Gain, Cryogenics, Photographs, Equations, Pictures, Ultrahigh frequency.

A traveling-wave maser tunable over the frequency range of 1340 Mc to 1430 Mc has been developed and constructed for use in radio astronomical research. It uses ruby as the maser material and a comb as the slow-wave structure. The net gain exceeds 30 dB over most of its tuning range, while the average instantaneous bandwidth is about 11 Mc. It has been designed for operation at 4.2 K. (Author)

AD-405 168 Div. 8, 25, 20
(TISTM/PCR) OTS price $5.60

David Sarnoff Research Center, Princeton, N. J.
SUSCEPTIBILITY IN SEMICONDUCTORS.
Final rept., 1 Apr 61-31 Mar 63,
by A. H. Moore and J. O. Kessler. 31 Mar 63, 44p.
Contract Nonr346700
Unclassified report

Descriptors: *Semiconductors, *Magnetic moments, *Plasma physics, Transport properties, Crystals, Equations, Theory, Germanium, Magnetic properties, Magnetic fields, Light, Temperature, Velocity, Cylindrical bodies, Electrons, Mathematical analysis.

This report is concerned with the magnetic moment M of a plasma consisting of holes and electrons generated by light within a cylindrical semi-

conductor crystal immersed in a magnetic field. Macroscopic transport equations have been used to derive the dependence of M on field strength, mobility, and surface recombination conditions. In the limits of low and high surface recombination the theoretical result demonstrates the transition between transverse equilibrium (M = 0) and pure magnetic confinement (M = -nkT/B). Experiments using germanium and an inhomogeneous magnetic field directly measured the diamagnetic force exerted by the plasma on its scattering medium. An induction method utilizing a uniform magnetic field of strength up to 70 kgauss gave collateral results. The dependence of the moment on magnetic field strength, light intensity, temperature, and surface recombination velocity support the theory. (Author)

AD-405 443 Div. 8, 12
(TISTP/WH) OTS price $15.50

Boeing Co., Seattle, Wash.
SPECIFICATION FOR AIRBORNE PCM/FM TELEMETRY SYSTEM COMPONENTS,
by Rick Urban. 1959, 166p. D10 20402
Unclassified report

Descriptors: *Pulse modulation, *Telemeter systems, *Specifications, *Frequency modulation, Coding, Guided missiles.

AD-405 463 Div. 8, 25
(TISTP/MH) OTS price $4.60

Institute of Science and Tech., U. of Michigan, Ann Arbor.
THE RADIATION FIELD PRODUCED BY AN INFINITE SLOT IN AN INFINITE CYLINDER SURROUNDED BY A HOMOGENEOUS PLASMA SHEATH,
by Dipak L. Sengupta. May 63, 39p. 4563 35T
Contract AF33 616 8365
Unclassified report

Descriptors: *Slot antennas, Plasma sheath, Gas ionization, Electric potential, Plasma physics, Cylindrical bodies, Dielectric films, Frequency, Functions, Electric insulations, Permeability, Electromagnetic properties.

The radiation properties of a slotted cylindrical antenna surrounded by a homogeneous plasma sheath were investigated. The slot is axial and extends along the entire length of the cylinder; it is fed by a voltage of constant magnitude and phase. The antenna is insulated from the plasma by a thin dielectric coating. General expressions for the field components are derived, and then simplified by making some physical approximations. The radiation patterns produced by the antenna are discussed for the following two cases: (1) when both the dielectric coating and the plasma sheath are thin; and (2) when only the dielectric coating is thin. For both cases field expressions are derived for operating frequency above the plasma frequency and below it. The effects of collision between the particles in the plasma are taken into account. Results for the collisionless case can be obtained from the general expressions given. Numerical results are obtained for the radiation patterns produced by the antenna under various physical situations. (Author)

AD-405 466 Div. 8, 26, 25
(TISTM/PCR) OTS price $2.60

Grace, W. R. and Co., Clarksville, Md.
APPLICATIONS REPORT ON REPRODUCIBLE THERMISTOR REFINEMENT PROGRAM.
Rept. for 5 Sep 61-31 Dec 62,
by M. C. Vanik, W. T. Barrett, J. E. Herrera, M. G. Sanchez, and E. M. Glocker. Feb 63, 23p.
Contract AF33 657 7104, Proj. 7 838
ASD TDR63 386
Unclassified report

Report on Reproducible Thermistor Refinement Program.

Descriptors: *Thermistors, *Resistors, Manufacturing methods, Silicon, Germanium, Test methods, Test equipment, Temperature, Life expectancy, Equations, Gold, Semiconductor devices, Copper, Silver, Nickel, Iron, Zinc, Platinum, Manganese, Thallium, Resistance (Electrical), Stability, Materials, Single crystals.

Gold-doped monocrystalline silicon exhibits temperature-resistivity behavior suitable for making highly reproducible, predictable and sensitive thermistors. Two types of thermistors were developed with reproducibilities of ±2% and operable ranges including -85 to +200 C. Manufacturing methods were developed and demonstrated on an unbalanced pilot line. A literature survey indicated that specially doped silicon or germanium offer the best possibilities of being used as single-crystal semiconductor thermistors. Silicon was chosen for development on the basis of energy gap, purity, resistivity, and availability. Many elements were screened as possible silicon thermistor dopants. These include gold, copper, silver, nickel, iron, zinc, platinum, manganese, and thallium. Only gold in both P- and N-type silicon gave products suitable for use in the -85 to +200 C range. (Author)

AD-405 484 Div. 8, 26
(TISTE/OHD) OTS price $2.60

Kuthe Labs. Inc., Newark, N. J.
PRODUCTION ENGINEERING MEASURE FOR A PHASE II SUPER POWER HYDROGEN THYRATRON TUBE.
Quarterly progress rept. no. 4, 7 Dec 62-6 Mar 63,
by H. E. Krefft. 6 Mar 63, 23p.
Contract DA36 039sc85985
Unclassified report

Descriptors: *Electron tubes, *Thyratrons, Power equipment, Electric potential, Electric currents, Anodes (Electron tube), Manufacturing methods, Hydrogen.

Based on experience obtained with the first two tubes constructed under this contract, three additional tubes per design A were built during the fourth quarter period covered by this report. They were made with a heavier flange and different seal for the anode. Owing to this change, assembly of the tube was made safer and more flexible, and better alignment between subassemblies and more accurate inspection became possible during assembly. Exhaust and thorough baking did not affect these tubes in any noticeable way. Operating characteristics were investigated and found to possess satisfactory reproducibility. Two tubes were operated successfully at the power level of the Stanford linear accelerator (epy = 40KV; Ib = 4.0 Adc; ib = 3000a). Construction of the test equipment is proceeding. (Author)

AD-405 487 Div. 8
(TISTE/JWS) OTS price $3.60

Army Electronics Research and Development Lab., Fort Monmouth, N. J.
LOGARITHMIC PERIODIC ANTENNA AS-1089(XE-1)/ML,
by Peter Bodnar. Jan 63, 37p. Task 3E54 01 001 02
AELRDL TR2343 Unclassified report

Descriptors: *Antennas, *Electronic countermeasure, Ultra high frequency, Antenna radiation patterns, Gain, Polarization, Power, Printed circuits, Standing wave ratios, Broadband.

The electrical and mechanical characteristics of Antenna AS-1089(XE-1)/ML, a small, lightweight, broadband antenna of the broadly directional, pyramidal log-periodic type, are discussed. The antenna covers the frequency range of 200 to 800 mc, and has moderate gain and a medium power-handling capability. Data on impedance, gain, pattern characteristics, and power-handling capability have been obtained experimentally and are presented in this report. Although designed specifically for transmitting operations in the frequency range of 275 to 600 mc, the antenna can efficiently transmit over the 200- to 800-mc band, and can receive over the 200- to 1200-mc range. (Author)

AD-405 562 Div. 8, 30
(TISTE/CAM) OTS price $1.60

Bendix Corp., Baltimore, Md.
ML-419 THERMISTOR P.E.M.
Quarterly progress rept. no. 1, Jan-Apr 63,
by J. T. George. 1 Apr 63, 10p.
Contract DA36 039AMC01465
Unclassified report

Descriptors: *Thermistors, *Manufacturing methods, Processing, Quality control, Coatings, Clay minerals, Mixtures, Iron compounds, Zirconium compounds, Oxides, Reliability, Test equipment, Reliability (Electronics), Radiosondes.

AD-405 613 Div. 8, 30
(TISTE/OHD) OTS price $15.00

Philco Corp., Philadelphia, Pa.
RADIO SET AN/TRC-56.
Final technical rept.,
by Quentin Veit, George Mackiw, Christopher Miedzius, and Edward Briedrycki. 16 Jan 63, 1v. 2304
Contract AF30 602 2331
RADC TDR62 563
Unclassified report

Descriptors: *Radio communication systems, *Radio equipment, Multiplex, X band, K band, Voice communication systems, Television communication systems, Data transmission systems, Semiconductor devices, Design, Radio transmitters, Radio receivers, Power supplies, Intermediate frequency amplifiers, Transistor amplifiers, Mobile, Superhigh frequency.

Experimental models of Radio Set AN/TRC-56 are described. The AN/TRC-56 radio set consists of a radio unit and a multiplex unit. The portable radio unit operates in either the 7.125 to 8.4 gc or 14.0 to 15.4 gc frequency bands. It is tripod-mounted and has a self-contained antenna. It is completely solid-state except for two klystrons which serve as the transmitter and local-oscillator tubes. The radio unit is capable of operating with various types of multiplex in addition to its companion AN/TRC-56 multiplex. It is also capable of carrying television signals. The AN/TRC-56 multiplex unit is a frequency-division multiplex equipped with twelve 4-kc voice channels and two 20-kc data channels, with expansion capability for an additional 10 data channels. Each voice channel is equipped with a termination unit providing two-wire, four-wire, a-c ringdown, and E & M dialing options. The unit is completely solid-state. This report contains the physical and functional descriptions, design goals, and test results for the experimental models. In addition, recommendations for future equipments are made. (Author)

AD-405 629 Div. 8
(TISTP/MH) OTS price $10.50

Carlyle Barton Lab., John Hopkins U., Baltimore, Md.
THE DETECTION OF MULTIPLE UNKNOWN SIGNALS BY ADAPTIVE FILTERS,
by J. W. Smith. May 63, 133p. TR AF103
Contract AF33 657 11029, Task 403601
Unclassified report

Descriptors: *Signals, *Adaptive control systems, Noise analyzers, Errors, Decision making, Identifiers, Signal-to-noise ratio, Data processing system, Automatic, Detection, Filters.

Filters which modify their structures in order to recognize initially unknown waveforms in Gaussian noise are investigated experimentally. The class of filters discussed include two types previously described in the literature and one new type designed explicitly for operating in a multiple waveform environment. The new structure processes the data in a nonlinear fashion and effectively sets up a narrow decision region about the estimate of the waveform. The parallel operation of adaptive systems for detecting and estimating the signal parameters of multiple signals simultaneously is also discussed. The results clearly demonstrate the possibility of using filters of the new type for automatic data processing. Results are given in the form of learning curves which show the effects of correct and incorrect decisions. Included in much of the discussion is a graphical interpretation of the filtering process. Two unusual applications of the new filter structure are discussed. (Author)

AD-405 695 Div. 8, 25
(TISTP/MH) OTS price $1.60

Foreign Tech Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
STUDY OF THERMAL ELECTRON EMISSION FROM A HOLLOW CATHODE,
by M. B. Pyt'yeva and Ye. M. Dubinina. 13 May 63, 13p.
FTD TT63 367
Unclassified report

Trans. from Russian periodical, Izvestiya akademii nauk SSSR, Seriya fizicheskaya, 26:11. pp. 1343-1348, 1962.

Descriptors: *Thermionic emission, Oxide cathodes, Emissivity, Electric currents, Density, Electric potential, Structures, Magnetic fields, Electron tubes, Electron beams, Anodes, Cathodes.

The great interest in hollow oxide cathodes has been brought on by the considerable current densities of cathode emission, by the low voltages at which they may be obtained, as well as by the small effective dimensions of the electron source and the insensitivity of the cathode to ionic bombardment. However, the mechanism of its emission has not yet been sufficiently studied; visual investigation of the structure of the beam formed by a system with a hollow cathode attests to its complexity. An attempt was made to explain current anomalies of the cathode on the basis of the structural characteristics of the beam. (Author)

AD-405 711 Div. 8, 14, 26
(TISTE/OHD) OTS price $6.60

National Beryllia Corp., Haskell, N. J.
BERYLLIUM OXIDE RADOME DEVELOPMENT.
Final engineering rept., 15 Mar-31 Dec 62.
31 Dec 62, 61p.
Contract NOw62 0592c
Unclassified report

Descriptors: *Radomes, *Ceramic materials, *Beryllium compounds, Oxides, Manufacturing methods, Casting, Precision finishing.

The objectives of this program are: to investigate and evaluate the various grades of BeO available for radome fabrication; to determine the optimum compositions and material preparation methods for forming; to utilize pressure casting as a means of forming BeO and determine the material and process parameters which control the properties of the finished pieces; to fabricate prototype radomes using the materials and process information established, so as to reduce final grinding to a minimum. (Author)

AD-405 752 Div. 8, 26
(TISTE/JBM) OTS price $1.60

Westinghouse Electric Corp., Dayton, Ohio.
500 C SILICON CARBIDE RECTIFIER PROGRAM COVERING PERIOD 1 JANUARY TO 31 MARCH 1963.
Interim technical progress rept. no. 6, 1 Jan-31 Mar 63.
31 Mar 63, 11p.
Contract AF33 657 7027
ASD TR7 727V6 Unclassified report

Descriptors: *Rectifiers, Heat transfer, Epitaxial growth, Silicon compounds, Carbides, Production, Sublimation, High temperature research, Stabilization, Nucleation, Diboranes, Diodes (Semiconductors)

Efforts were continued on the production of 500 degree centigrade silicon carbide rectifiers. The effect of different sized cavities were investigated in the standard sublimation furnace. It was found that larger cavities greatly affect growth conditions and under normal circumstances little is gained by changing cavity geometry. Different heat sinks produced an effect on the crystal growth, but there was no significant effect on the increase of yield. Epitaxial growth of thin SiC layers of both p and n-type was achieved on silicon carbide substrates. Small area epitaxial rectifiers are being prepared for evaluation. A simplified passivation technique was developed for the one ampere rectifier. (Author)

AD-405 775 Div. 8
(TISTE/JWS) OTS price $4.60

Sylvania Electric Products, Inc., Woburn, Mass.
PRODUCTION ENGINEERING MEASURE FOR GALLIUM ARSENIDE VARACTOR DIODE.
Quarterly progress rept. no. 3, 1 Dec 62-28 Feb 63,
by T. Baker. 28 Feb 63, 24p.
Contract DA36 039sc86736
Unclassified report

Descriptors: *Varactor diodes, Gallium alloys, Arsenides, Capacitance, Photo engraving, Diffusion, Zinc, Impurities, Containers, Extremely high frequency, Manufacturing methods.

Studies to obtain the processes necessary for the high-volume production of gallium arsenide varactor diodes are described. These investigations include diffusion, ohmic contacts, junction formation and packaging. A diffusion process utilizing zinc and arsenic as a diffusant source is described as well as a low-resistance, P-type contact and a successful procedure for a uniform mesa formation. (Author)

AD-405 778 Div. 8
(TISTP/MH) OTS price $2.60

Army Electronics Research and Development Agency, Fort Monmouth, N. J.
X-BAND SEMICONDUCTOR SWITCHING AND LIMITING USING WAVEGUIDE SERIES TEES,
by V. J. Higgins. Mar 63, 21p
DA Task 3A99 21 001 03
AELRDL TR2349 Unclassified report

Descriptors: *Switching circuits, *Semiconductor devices, Varactor diodes, X band, Microwaves, Crystals, Diodes (Semiconductors), Waveguides, Power, Limiters, Bandwidth, Radio-frequency power, Waveguide filters.

A new microwave semiconductor switching technique X-band is described. This technique uses various types of varactor diodes operating in a series mode. Series mode switching is obtained by cascading several E-plane tee junctions. Each tee is terminated in a fixed tuned crystal mount. A diode when inserted in its holder is spaced in an integral half guide wavelength from the junction of the series arm nd the main waveguide, and each series arm is separated by odd integers of quarter wavelengths. Isolations of 30 to 48 db and insertion losses of 0.3 to 0.8 db were obtained at a frequency of 9375 mc/s. Details of a semiconductor X-band power limiter are given. The limiter consists of the same configuration as the switch except that it is not externally biased. Isolations of 20 to 30 db over a bandwidth of 180 to 250 mc/s and insertion loss of 1.2 db and less over a 500 mc/s bandwidth were noted. (Author)

AD-405 785 Div. 8, 23
(TISTE/PAR) OTS price $7.60

Signal Corps., Washington, D. C.
THE THIRD ARMED FORCES TELEVISION CONFERENCE, FORT LEE, VIRGINIA. 17-19 OCTOBER 1962.
Apr 63, 82p.
Unclassified report

Descriptors: *Television communication systems, *Education, Television cameras, Television display systems, Television equipment, Television guidance, Training devices, Training, Military training, Television receivers Television stations, Military facilities, Military medicine, Military organizations Symposia.

AD-405 792 Div. 8, 26
(TISTE/PAR) OTS price $1.60

Piezo Crystal Co., Carlisle, Pa.
PRODUCTION ENGINEERING MEASURE VHF CRYSTAL UNITS CR(XM-36)/U.
Quarterly rept. no. 6, 1 Oct-30 Dec 62.
30 Dec 62, 14p.
Contract DA36 039sc85971
Unclassified report

Descriptors: *Quartz, Processing, Crystal oscillators, Very high frequency, Temperature Resistance (Electrical), Plating, Aluminum coatings, Aging, Production, Manufacturing methods, Quality control, Military requirements Tests, Crystals.

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

Production engineering measure of VHF crystal units was continued. Ninety percent of the units showed resistance peaks during temperature testing. This was true of all of the 9th overtone crystals at all the frequencies 150 to 200 mc. Investigation of these resistance peaks indicated that very low drive levels would eliminate them, and operating crystals on the 7th mode reduced the number of rejects for resistance peaks to 20% or less. Other plating metals were tried, some of which show favorable results for resistance peaks during temperature test. These metals had other unfavorable properties for present techniques and equipment. They also gave very poor aging properties. (Author)

AD-405 803 Div. 8, 25
(TISTE/JWS) OTS price $5.60

Cornell U., School of Electrical Engineering, Ithaca, N. Y.
NOISE NEAR THE CARRIER IN MICROWAVE OSCILLATORS,
by C. H. Mosher. 1 Oct 62, 56p. RR EE538; TR10
Contract DA36 039sc87368
Unclassified report

Descriptors: *Noise (Radio), *Microwave oscillators, Frequency analyzers, Sidebands, Mixers (Electronic), Test equipment (Electronics), Correlators, Calibration, Matrix algebra, Amplitude modulation, Backward wave oscillators, Klystrons, Functions, Phase shifters, Measurement.

This study of noise near the carrier in microwave oscillators was primarily an experimental survey of typical tubes. The noise in the oscillator's output was detected as equivalent modulation by a receiver similar to those used in noise-measuring test sets available commercially. The signals of interest were fed into a spectrum analyzer which resolved them into self- and cross-spectra, the frequency range from 14 c/s to 34 kc/s being resolved into 25 bands of about 1/2 octave each. The cross spectra were derived from measurements of the self-spectra of linear combinations of the signals, with wide-band phase shifters having been used to permit observation of the imaginary components of the cross spectra. It was found that amplitude noise in the outputs of the oscillators tested (VA203, V217, VA161, QK610, 357H) was too small to be observable with a receiver of this type, and that internally generated low-frequency beam-current fluctuations were not significant in producing frequency noise. The frequency-noise spectra observed were consistent with spectra that might be expected from theory, if independent ions were assumed in the interaction region. (Author)

AD-405 818 Div. 8, 15
(TISTP/JEA) OTS price $3.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
DERIVATION OF RELIABILITY FORMULAS FOR A THREE-DIMENSIONAL MATRIX OF EQUIVALENT COMPONENTS,
by A. V. Pershing. 19 Apr 63, 1v. A065441
Contract AF04 647 787
Unclassified report

Descriptors: *Checkout procedures, *Matrix algebra, *Mathematical models, Reliability, Equations, Multipath transmission, Series, Signals, Computer logic, Probability, Failures (Mechanics), Electronic equipment, Digital systems.

A set of equations is developed that describe the reliability of any three-dimensional matrix of equivalent components. In addition, the report gives the step-by-step mathematical sequence used in deriving the general equations from the equations for the most simple two-dimensional parallel-series arrangement of components. (Author)

AD-405 839 Div. 8, 25
(TISTE/JWS) OTS price $4.60

Martin Marietta Corp., Baltimore, Md.
OPTIMUM APERTURE STUDY.
Suppl. to quarterly rept. no. 3.
May 63, 44p.
Contract AF30 602 2676, Proj. 4506, Task 450604
RADC TDR63 10 S1 Unclassified report

Suppl. to AD-298 300.

Descriptors: *Antenna radiation patterns, Moments, Functions, Illumination, Programming (Computers), Antenna lobes, Slot antennas, Mathematical prediction.

The applicability is studied of the Wiener-Spencer Theorem to antennas. This theorem states that minimum standard deviation of the far-field pattern occurs when the illumination function corresponds to the lowest mode of vibration of a membrane stretched across the aperture opening. The investigation of four selected nonoptimum illuminations for the elliptical apertures is presented. Approximations are used to obtain expressions for far-field power patterns, and second moments are tabulated. In addition, illuminations and far-field power patterns are plotted. (Author)

AD-405 845 Div. 8, 16, 7
(TISTM/PCR) OTS price $6.60

American Biophysics Research Lab., Colmar, Pa.
MICROMINIATURIZED ELECTRONICS IN BIOLOGY AND MEDICINE,
by C. G. Reinhardt, Jr. 1963, 1v. MS1
Contract Nonr367600
Unclassified report

Descriptors: *Miniature electronic equipment, *Molecular electronics, *Power supplies, *Telemeter systems, Medicine, Microminiaturization (Electronics), Printed circuits, Subminiature electronic equipment, Thin films (Storage devices), Resistors, Capacitors, Inductance, Semiconductor devices, Manufacturing methods, Radio transmitters, Antennas, Electron tubes, Transistors, Life expectancy, Radio transmission, Biology, Circuits, Batteries & components, Test equipment.

This report is prepared primarily for biologists and biophysicists actively engaged in the field of biotelemetry in order to acquaint them with microelectronics and its particular applications to their areas of interest. Biotelemetry is defined here as the transmission of information concerning biological parameters from a test specimen or organism to an observer. By the word transmission, we imply that the organism and observer are remotely located. Since we are primarily concerned with reaching an audience which is not actively engaged with electronic research, nor the advanced construction techniques utilized in microcircuitry, detailed technical analysis has been omitted, although the references cited will provide information of this nature. Our most important consideration is the application of microtechnology to biological problems. (Author)

AD-405 851 Div. 8, 25
(TISTE/CAM) OTS price $4.60

General Electric Co., Syracuse, N. Y.
SOLID STATE MICROWAVE DELAY LINE.
Final technical rept., 15 Jan 62-15 Jan 63,
by W. Brouillette. 15 Mar 63, 41p.
Contract AF30 602 2230, Proj. 5578, Task 557802
RADC TDR63 149 Unclassified report

Descriptors: *Delay lines, *Quartz, *Acoustics, *Sound generators, Broadband, Sound, Microwave frequency, Materials, Anisotropy, Magnetostriction, Electroplating, Measurement, Impedance matching, Theory, Propagation, Acoustic impedance, Delay circuits, Partial differential equations, Motion, Ultrahigh frequency, Electroacoustic transducers, Solid state physics, Semiconducting films, Magnetostrictive elements.

Techniques for broadband generation of sound at microwave frequencies were developed. Using thin magnetostrictive film and a fine wire with a broadband strip line, delay action was achieved over an 800 mc band from 1.1 gc to 1.9 gc. The theory of reflections and a detailed study of appropriate modes in quartz is discussed, with a method of designing a folded path delay line. (Author)

AD-405 853 Div. 8
(TISTE/CAM) OTS price $1.60

Curtiss-Wright Corp., East Paterson, N. J.
STUDY OF PROJECTION IATRON APPLICATION TO HIGH SPEED MULTICHANNEL PLOTTER.
Final rept.,
by Max Kerman. 16 Mar 63, 16p.
Contract N61339 1188
NAVTRADEVCEN 1188 1 Unclassified report

Descriptors: *Cathode ray tubes, *Display systems, Radar equipment, Cathode ray tube screens, Brightness, Resolution, Electronic recording system, Antisubmarine warfare, Feasibility studies, Plan position indicators, Plotters.

This was a study to explore the feasibility of using the projection Iatron (FW-201) as the display readout device in a high speed multichannel electronic plotting display system. The primary task is the evaluation of its suitability as determined by its storage, resolution, brightness, and writing rate. An existing equipment was therefore temporarily modified to provide the proper operating signals and voltages in accordance with the proposed application and the Iatron specifications. The equipment was checked out using an experimental tube. The two regular projection Iatrons (FW-201) were tested. (Author)

AD-405 861 Div. 8
(TISTE/CAM) OTS price $2.60

Westinghouse Electric Corp., Youngwood, Pa.
MICROMINIATURE INTEGRATED CIRCUIT PACKAGE.
Quarterly progress rept. no. 2, 1 Oct 62-1 Jan 63
by E. P. Barbaro. 1 Jan 63, 11p.
Contract DA36 039sc90850, DA Proj. 3A99 21 002 01
Unclassified report

Descriptors: *Microminiaturization (Electronics), *Integrated circuits, *Packaged circuits, *Modules (Electronics), Processing, Seals (Stoppers), Graphite, Glass, Chemical milling, Cleaning, Mechanical properties.

Two successive design modifications were made to the graphite glassing boats in order to achieve more uniform package appearance. Fifty package samples were submitted for mechanical evaluation. Techniques for sealing the integrated circuit package were established. Improved cleaning techniques were established for deoxidizing kovar parts prior to gold plating resulting in less pitting of the metal. Stamped lead preforms were received during this period. The first one hundred microminiature circuit packages submitted were fabricated with etched leads. The stamped leads are more uniform in cross section. Ceramic micromodules with pads were designed and ordered. This micromodule will be utilized to develop an integral package using the ceramic micromodule as a base. (Author)

AD-405 874 Div. 8, 25, 5, 6
(TISTM/PCR) OTS price $3.60

MITRE Corp., Bedford, Mass.
RADAR SYSTEMS AND TECHNIQUES DEPARTMENT. MICROWAVE TECHNIQUES SUBDEPARTMENT QPR, JULY 1, 1962-SEPTEMBER 30, 1962.
May 63, 35p. PM22 17
Contract AF33 600 39852, Projs. 602 and 750
ESD TDR63 181 Unclassified report

Descriptors: *Microwave networks, *Parametric amplifiers, *Antennas, *Lasers, *Microwave amplifiers, *Limiters, Microwave relay systems Solid state physics, Phase measurement, Diodes Electron beams, Antenna feeds, Noise (Radar), Communication systems, X band, Power supplies Antenna radiation patterns, Ruby, Cryogenics Microwave equipment, L band, Monopulse radar Design, Tunnel diodes, Ferrites.

AD-405 878 Div. 8
(TISTE/BRW) OTS price $1.10

General Electric Co., Schenectady, N. Y.
OPTIMUM DESIGN OF CYLINDRICAL ELECTRON BOMBARDMENT HEATERS,
by J. M. Houston, T. A. Howlett, and H. F. Webster. May 63, 6p. SR4
Contract AF19 604 8424, Proj. 8659, Task 865902
AFCRL 63 453 Unclassified report

Descriptors: *Electron tube heaters, *Heating, Cylindrical bodies, Thermionic converters, Design, Electron bombardment.

It is shown that an optimum geometry exists for a cylindrical electron bombardment heater in which maximum thermal flux is to be delivered with stable operation and long life of the bombardment heater coil. The procedure for finding the stable operating condition is illustrated, and the optimum heater size is evaluated. (Author)

9. FLUID MECHANICS

AD-404 711 Div. 9
(TISTP/FEM) OTS price $3.60

Massachusetts Inst. of Tech., Div. of Sponsored Research, Cambridge, Mass.
THE PREDICTION OF LOW QUALITY BOILING VOIDS,
by Peter Griffith. Jan 63, 26p. TR23; Rept. no. 7 7673 23
Contract Nonr184139
Unclassified report

Descriptors: *Cavitation, *Fluid dynamic properties, Pipes, Liquids, Velocity, Reynolds number, Experimental data, Pressure, Mathematical prediction, Boiling, Bubbles.

Slug flow theory is used to predict the density in heated channels of various shapes. In order

to make this calculation possible, measurements are made of the bubble-rise velocity in annuli, tube bundles, and channels. It is found that the large dimension is most important in channels, and the shroud dimension most important in annuli and tube bundles. It is also found that no rotationally symmetrical bubble shapes are obtained in annuli and tube bundles. Finally, a comparison is made between the theory, which contains no free constants, and the experiments. The comparison is good. The results, as presented, apply only to vertical, heated channels of various shapes with up-flow in the low quality region. (Author)

AD-404 739 Div. 9, 12 30
(TISTM/PCR) OTS price $6.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
MEASUREMENTS OF HYPERVELOCITY STAGNATION POINT HEAT TRANSFER IN SIMULATED PLANETARY ATMOSPHERES
by J. S. Gruszczynski and W. R. Warren. Mar 63 65p. R63SD29
Contracts AF49 638 931 and NAS7 100
Unclassified report

Descriptors: *Stagnation point, *Heat transfer, *Planetary atmospheres, Simulation, Test facilities, Test methods, Shock tubes, Space flight, Aerodynamic heating, Atmosphere entry Blunt bodies, Electric arcs, Thermodynamics, Thermal radiation, Photographs, Pictures, Equations, Carbon dioxide, Nitrogen, Venus.

The heat transfer to the stagnation region of a hemispherical body at flight velocities up to 40,000 ft/sec in two CO2-N2 gas mixtures corresponding to the expected atmosphere of Venus was investigated experimentally in the electrically driven hypervelocity shock tube. These results are compared with heat transfer data in pure CO2 and pure N2. Calculations of radiative heat transfer contribution to the total heating are shown. Also, shock tube performance in two gas compositions as used in these experiments was computed. An attempt was made to measure radiant heat transfer to the stagnation region using the newly developed cavity gage. (Author)

AD-404 748 Div. 9, 1
(TISTP/WH) OTS price $12.50

Ordnance Research Lab., Pennsylvania State U., University Park.
REAL FLOW OVER A BODY OF REVOLUTION AT ANGLE OF ATTACK,
by E. J. Rodgers. 28 Mar 63, 164p. TM5 2420 13
Contract NOrd16597
Unclassified report

Descriptors: *Aerodynamic configurations, *Bodies of revolution, *Aerodynamic characteristics, *Gas flow, Wing-body configurations, Vortices, Turbulent boundary layers, Lift, Drag, Potential theory, Laminar boundary layer, Aerodynamic control surfaces, Angle of attack.

Certain conclusions can now be made regarding the problem. The vorticity is generated by a skewness of the boundary layer resulting from the low velocity regions near the body being influenced by the pressure forces and viscous forces. The vorticity increases in strength along the body length. It is transported with, and diffuses through, the flow thus covering a larger region on the top part of the body than on the bottom. As the vorticity is transported with the flow it starts to assume more of an axial direction. The strongest component of vorticity is that in the circumferential direction and is associated with the axial component of the boundary layer flow. The axial component of vorticity is also an important component. A symmetrical concentrated vortex pair, fed by a weak vortex sheet, does not exist. The axial component of the vorticity gives the impression of the existence of this vortex pair. (Author)

AD-404 787 Div. 9, 15
(TISTP/CCH) OTS price $2.60

Space Technology Labs., Inc., Los Angeles, Calif
APPLICATION OF A DISCRETE VELOCITY MODEL TO THE BOLTZMANN EQUATION IN SHEAR FLOWS
by James E. Broadwell. May 63, 20p
9813 6004 RU000
Unclassified report

Descriptors: *Special functions (Mathematical) *Fluid flow, Relaxation time, Laminar flow, Shear stresses, Couette flow, Viscosity, Distribution, Models (Simulation), Differential equations, Velocity.

The application of a simple discrete velocity model to low Mach number Couette and Rayleigh flow is investigated. In the model, the molecular velocities are restricted to a finite set and in this study only eight equal speed velocities are allowed. The Boltzmann equation is reduced by this approximation to a set of coupled differential equations which are shown to be identical in form to those produced when the same approximation is applied to the Krook equation. The fluid velocity and shear stress in Couette flow are in approximate accord with those of Wang Chang and Uhlenbeck and of Lees over the complete range of Knudsen number. (Author)

AD-404 858 Div. 9, 15
(TISTP/JW) OTS price $6.60

Boeing Scientific Research Labs., Seattle, Wash.
SLENDER BODIES OF REVOLUTION HAVING MINIMUM TOTAL DRAG AT HYPERSONIC SPEEDS,
by Angelo Miele and David G. Hull. Feb 63, 42p.
FSLTR70; D1 82 0230
Unclassified report

Also available from the author.

Descriptors: *Hypersonic flow, Bodies of revolution, Boundary value problems, Drag.

The problem is considered of minimizing the total drag (sum of the pressure drag and the friction drag) of a slender, axisymmetric body at zero angle of attack in hypersonic flow under the assumption that the distribution of pressure coefficients is Newtonian and that the friction coefficient is constant. After the condition that the pressure coefficient be nonnegative is accounted for, the minimal problem is solved for arbitrary conditions imposed on the diameter, the length, and the volume under the assumption that the wetted area is fee. It is shown that, if convenient dimensionless coordinates are employed (that is, if the abscissa and the ordinate are normalized with respect to the length and the semithickness), the totality of extremal arcs is composed of a two-parameter family of solutions. (Author)

AD-404 864 Div. 9, 30, 31
(TISTE/OHD) OTS price $1.60

David Taylor Model Basin, Washington, D. C.
PROPELLER VORTEX CAVITATION INCEPTION STUDIES,
by John M. Coon. Mar 63, 10p.
Proj. S R009 01 01
DTMB 1724
Unclassified report

Descriptors: *Propellers (Marine), *Cavitation, Propeller hubs Model tests, Geometric forms, Determination.

Three TMB propellers were tested to determine the effect of pitch distribution on hub cavitation inception. Three fairwaters of varying geometry were also evaluated for their effect on inception of this type of cavitation. Observation of inception speeds on tip-vortex cavitation were also made. The propellers tested in the 24-inch variable pressure water tunnel were TMB Propellers No's. 2963, 2964, and 2965. Fairwater geometries evaluated were 5 deg diverging and 5 deg converging truncated cones, and a conventional ogive configuration. The tests were performed at several cavitation indices over a range of speed coefficients. It was found that reduction of the pitch at the tip delayed tip-vortex cavitation inception, whereas inception at the hub occurred earlier. Hub-vortex cavitation inception was delayed the most when the 5 deg diverging conical fairwater was used. (Author)

AD-404 880 Div. 9, 31
(TISTP/WH) OTS price $9.10

Material Lab., New York Naval Shipyard, Brooklyn
MATHEMATICAL METHODS FOR CALCULATING SHIP HULL FORMS OF DECREASED WAVE-MAKING RESISTANCE,
by S. W. W. Shor. 29 Apr 63, 99p.
Unclassified report

Descriptors: *Ship hulls, *Water waves, *Drag, *Hydrodynamics, Numerical methods and procedures, Differential equations, Marine engineering.

The development of ship hull forms of decreased wave-making resistance by mathematical methods has received some investigation in the past few years but little application. However, it appears that much more application can be obtained by use of improved mathematical methods recently developed. The theory and effectiveness of work done by other authors is reviewed. In addition, the mathematical machinery necessary to calculate hull forms by a method of steep descent is developed and applied to a simple example. The necessary resistance equations are formulated. A closed form solution is obtained for the smoothly varying portion of the wave-making resistance of an assemblage of sources and sinks traveling near the surface of the water. An integral for the interference terms which comprise the fluctuating portion of the wave-making resistance is also presented in the shape of a Laplace transform. It is concluded that much more extensive use may be made of mathematical methods to improve hull forms than has been the case heretofore. (Author)

AD-404 894 Div. 9
(TISTP/MFA) OTS price $4.60

Stanford U., Calif.
EFFECTS OF GEOMETRY AND UNIDIRECTIONAL BODY FORCES ON THE STABILITY OF LIQUID LAYERS,
by Max Anliker and Wen-Yi Shih Pi. Mar 63, 40p.
TR4; SUDAER150
Contract Nonr22530
Unclassified report

Descriptors: *Boundary layer, *Liquids, *Vibration, Oscillation, Bessel functions, Partial differential equations, Fluid flow, Pressure, Density, Transformations (Mathematics), Velocity, Stability, Theory, Surface properties, Analysis.

The stability of liquid layers with a prescribed interface geometry in the presence of surface tension and unidirectional body forces is investigated theoretically by means of a small vibration analysis. The fluid of the layers is assumed to be incompressible and inviscid and the flow irrotational. Particular emphasis is given to the effects of geometry and unidirectional body forces on the stability of such layers. They are studied by means of a semi-inverse method which allows the exact determination of particular eigenvibrations. Following the classical method of investigating the stability of systems, equations of motion are established for small perturbations of the equilibrium configuration and the boundary conditions for both two- and three-dimensional layers with interface surfaces having a constant mean curvature are formulated. Pertinent equations are linearized and expressed in terms of the velocity potential. By separating the time and space variables, the vibration problem is reduced to an eigenvalue problem. (Author)

AD-404 909 Div. 9
(TISTP/FEM) OTS price $1.60

Aerospace Information Div., Washington, D. C.
TRANSFER PROCESSES IN A FREE (JET) TURBULENT BOUNDARY LAYER,
by V. A. Vulis, T. P. Leontiyeva, I. B. Palatnik Z. B. Sakipov, and B. P. Ustimenko. 16 May 63 17p.
AID T63 73 Unclassified report

Trans. of paper was presented at the Conference on Heat and Mass Exchange held in Minsk in 1961

Descriptors: *Turbulent boundary layer, *Jet mixing flow, Heat, Distribution, Thermal diffusion, Compressible flow, Incompressible flow, Boundary layer, Boundary value problems, Equations, Velocity, Nozzles, Jets, Turbulence (Motion), Integral equations, Liquids, Gases, Heat transfer, Axially symmetric flow.

AD-404 916 Div. 9
(TISTP/MFA) OTS price $1.60

Redstone Scientific Information Center, Redstone Arsenal, Ala.
THE CALCULATION OF A THERMAL BOUNDARY LAYER IN THE FLOW OF A COMPRESSIBLE GAS,
by L. M. Zysina-Molozhen, tr. by Ingeborg V Baker. 10 Apr 63, 10p.
RSIC 11 Unclassified report

Trans. from Inzhenerno-Fizicheskii Zhurnal 5:6, pp. 21-6, 1962.

Descriptors: *Boundary layer, *Gases, Turbulent boundary layer, Laminar boundary layer, Velocity, Drag, Heat transfer, Density, Numerical analysis, Compressible flow.

A semi-empirical approximation method which permits calculation with adequate accuracy of the laminar, transient and turbulent regions of a thermal boundary layer during flow of compressible gas over its surface, is examined. (Author)

AD-404 922 Div. 9
(TISTP/FEM) OTS price $4.60

Aerospace Corp., Los Angeles, Calif.
AERODYNAMIC COEFFICIENTS FROM SHOCK EXPANSION THEORY: ANALYTICAL DEVELOPMENT FOR PLANAR SURFACES,
by M. H. Lock. 29 Apr 63, 37p. TDR169 3230 11 TN13
Contract AF04 695 169
SSD TDR63 87 Unclassified report

Descriptors: *Aerodynamic loading, *Aerodynamic configuration, *Shock waves, *Load distribution, Aerodynamic characteristics, Pressure, Distribution, Stability, Oscillation, Compressible flow, Control surfaces, Mathematical analysis, Equations, Theory, Airfoils, Hypersonic flow.

A simplified version of the shock expansion theory is employed to estimate the unsteady aerodynamic loading on a planar surface. Expressions for oscillatory aerodynamic coefficients are developed for the case of a three-degrees-of-freedom airfoil section. (Author)

AD-405 038 Div. 9
(TISTP/WH) OTS price $7.60

Applied Physics Lab., Johns Hopkins U., Silver Spring, Md.
ANALYTICAL APPROXIMATIONS FOR STATIONARY CONICAL DETONATIONS AND DEFLAGRATIONS IN SUPERSONIC FLOW,
by Henry W. Woolard. May 63, 70p. TG446
Contract NOw62 0604
Unclassified report

Descriptors: *Conical bodies, *Supersonic flow, *Detonation, *Shock waves, Combustion, Differential equations, Chemical reactions, Impact shock, Gas flow.

Approximate analytical relations are developed for several possible ''conical'' flow fields resulting from the steady supersonic flow of a uniform, non-viscous, non-heat conducting, combustible-gas mixture past a semi-infinite cone (at zero angle of attack) for instantaneous chemical reaction. The flow fields considered are of the shock-deflagration, detonation, and detonation-shock types with attached adiabatic and diabatic discontinuities. Particular emphasis is placed upon the Chapman-Jouguet detonation. Parametric curves are presented for shock-deflagration flows about cones and wedges, and Chapman-Jouguet detonative flows about cones. Generalized analyses of the flow characteristics of an oblique exothermic discontinuity are given in the appendices. (Author)

AD-405 108 Div. 9
(TISTP/WH) OTS price $2.25

Aeronautical Systems Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
INVESTIGATION OF FLOW VARIABLES OVER A SERIES OF REARWARD FACING STEPPED FLAT PLATES AT A NOMINAL MACH NUMBER OF 4.15.
Final rept.,
by Richard R. Smith. Apr 63, 73p.
Proj. 1366, Task 136607
ASD TDR63 131
Unclassified report

Report on Aerodynamics and Flight Mechanics.

Descriptors: *Aerodynamic configurations, *Boundary layer control, Fluid mechanics, Hypersonic wind tunnels, Schlieren photography, Jets, Hypersonic flow.

A study was made of the aerodynamic characteristics over a flat plate with basic changes in the flow field imposed by geometric and aerodynamic means. Pressure distributions and Schlieren photographs were used to show the effects of (1) leading edge bluntness, (2) rearward facing step, (3) rearward facing step with gas ejected from the vertical face of the step, and (4) a control surface. Although three dimensional effects were large at high angles of attack, the flat plate results correlated well with theory and other experimental data. The effects of leading edge bluntness, step height, and ejection angle are small. The effect of gas ejection, in the manner tested, is not sufficient to produce the effect of a physical control surface. (Author)

AD-405 131 Div. 9, 15, 2
(TISTP/MFA) OTS price $5.60

Naval Weapons Lab., Dahlgren, Va.
ROTATING FLOWS NORMAL TO A FLAT SURFACE,
by Ernst W. Schwiderski and Hans J. Lugt.
Apr 63, 1v.
NWL 1853
Unclassified report

Descriptors: *Boundary layer, *Vortices, *Meteorology, Numerical analysis, Fluid flow, Reynolds number, Integral equations, Surface properties, Partial differential equations, Transformations (Mathematics), Velocity, Pressure, Numerical methods and procedures, Tables, Theory, Analysis, Tropical cyclones.

Numerical solutions of three-parameter vortex flows over flat surfaces and of rotating flows of von Karman's and Bodewadt's types are presented for a variety of Reynolds numbers. The results have been obtained on the basis of an extended boundary-layer theory, which allows a reduction of the Navier-Stokes equations to a set of Volterra integral equations. The new flows are in good agreement with available physical observations. (Author)

AD-405 611 Div. 9, 1
(TISTA/LSK) OTS price $4.60

Technische Hochschule, Vienna (Austria).
ELASTIC THERMAL STRESSES IN DELTA WINGS. PART II,
by H. Parkus. 15 Dec 62, 37p.
Contract AF61 052 214
AFOSR 4584
Unclassified report

Descriptors: *Delta wings, Aerodynamic heating, Equations, Theory, Numerical analysis, Thermal stresses, Aerothermoelasticity.

The study of thermal stresses in delta wings is continued. Equations of first approximation for the skew-symmetric temperature part are derived and solved. A numerical example is given. Then the equations of second (and final) approximation are obtained and solved for both the symmetric and the skew-symmetric part. The numerical example is continued into the second approximation. (Author)

AD-405 679 Div. 9, 31
(TISTP/JEA) OTS price $3.60

Hydronautics Inc., Laurel, Md.
ON FINITE LENGTH CAVITIES BENEATH A FREE SURFACE,
by B. Yim. Dec 62, 30p. TR119 4
Contract NObs84296
Unclassified report

Descriptors: *Cavitation, *Fluid dynamic properties, Cylindrical bodies, Numerical analysis, Hydrofoils, Downwash, Drag, Thickness, Fluid flow, Pressure, Integral transforms, Velocity, Boundary layers, Transformations (Mathematics), Complex variables.

The two-dimensional flow under a free surface with non-zero cavitation number is considered using a 'point drag' cavity model. The drag coefficient is obtained in closed form as a function of the cavitation number and the curvature at the cavity end (or nose), but not explicitly of the depth. The thickness-length ratio of the cavity is calculated numerically and compared with the case of an elliptic cylin-

der under a free surface. The three-dimensional effect on the cavity is also considered by the approximation of the cavity to an ellipsoid. These results should be of use in the estimation of the shape of cavities behind ventilated hydrofoil wings and in the subsequent calculation of downwash. (Author)

AD-405 693 Div. 9, 25
(TISTM/PCR) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command Wright-Patterson Air Force Base, Ohio.
TAKING INTO ACCOUNT THE MOLECULAR COMPOSITION OF AIR IN CALCULATIONS OF AERODYNAMIC FORCE COEFFICIENTS AND BODY TEMPERATURE IN FREE-MOLECULE FLOW AT HIGH SUPERSONIC VELOCITIES,
by V. S. Galkin. 24 Apr 63, 5p.
FTD TT63 361 Unclassified report

Trans. from Russian Periodical, Inzhenernyy zhurnal, 1:1, pp. 175-176, 1961.

Descriptors: *Supersonic flow, *Aerodynamic characteristics, Temperature, Air, Dynamics, Drag, Lift, Equations, Mathematical analysis, Molecular properties.

AD-405 720 Div. 9, 25
(TISTP/JEA) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
TURBULENT BOUNDARY LAYER IN A GAS FLOW WITH HEAT TRANSFER AND A PRANDTL NUMBER DIFFERENT FROM UNITY,
by Yu. V. Lapin. 14 May 63, 15p.
FTD TT63 284 Unclassified report

Trans. from Tekhnicheskaya Gidromekhanika, Gosudarstvennoye Nauchno-Tekhnicheskoye Izdatel'stvo Mashinostroitel'noy Literatury, Trudy LPN, Moskva, no. 217, pp. 27-36, 1961.

Descriptors: *Turbulent boundary layers, *Gas flow, *Heat transfer, Fluid dynamic properties, Pressure, Friction, Momentum, Differential equations, Velocity, Integral equations, Compressible flow, Supersonic flow.

The existing methods of calculation of turbulent boundary layer in a gas with heat transfer for both the case of a flow past a flat plate and for the flow with pressure gradients are based on the transfer to gas dynamics of the formulas of semiempirical theories of turbulence. This article is in this sense no exception. The solution is obtained for the flow of gas with a moderate pressure gradient and with an arbitrary temperature distribution at the wall since the Karman semiempirical theory is used. The influence of the pressure gradient is calculated only across the external flow. The temperature range is examined in which the Prandtl number and the specific heat can be considered constant, regardless of temperature. The analytical expression for the parameter H = delta/delta is obtained, depending on the conditions at the wall and at the exterior boundary layer. The final formula obtained for the calculation of friction does not require the use of various types of auxiliary graphs and tables, as in other existing methods. This advantage can prove to be beneficial in a number of cases. The calculation of heat transfer is based on Reynold's analogy. (Author)

AD-405 736 Div. 9
(TISTP/MFA) OTS price $3.60

Air Force Cambridge Research Labs., Bedford, Mass.
UPPER ATMOSPHERE DENSITY OBTAINED FROM FALLING SPHERE DRAG MEASUREMENTS,
by G. A. Faucher, R. W. Procunier and F. S. Sherman. Dec 62, 27p.
Proj. 6690
AFCRL 62 1136 Unclassified report

Descriptors: *Inflatable structures, *Drag, Air, Density, Accelerometers, Sounding rockets, Velocity, Time, Atmosphere models, Instrumentation, Telemetering transmitters, Radar beacons, Test vehicles, Rocket trajectories, Upper atmosphere, Measurement.

A density profile vs altitude from 95 to 130 km, obtained from drag measurements are made directly from within a falling sphere, is presented. The main sensors are linear accelerometers aligned to measure X, Y, Z components of acceleration of the sphere from which total drag is obtained. The method consists of ejecting an inflatable sphere somewhere between 80 and 100 km on the ascent of an Aerobee 150 rocket flight. From ejection, the sphere continues to approximately 250 km altitude on a trajectory which is, except for drag, a free-fall trajectory. The prediction of sphere drag coefficients with their estimated probable errors are given in the altitude range from 90 to 160 km. The telemetry record showing the drag forces used in calculating the density profile in the altitude range 95 to 130 km is shown. The sources of error in the calculated density are analyzed and tabulated. The calculated density in kilograms/cu m vs altitude in kilometers is compared with the ARDC Model Atmospheres of 1956, 1959, and 1961. (Author)

AD-405 807 Div. 9, 8, 25
(TISTP/JEA) OTS price $4.60

AVCO Everett Research Lab., Everett, Mass.
HYDRODYNAMIC EFFECTS PRODUCED BY PULSE MICROWAVE DISCHARGES,
by S. C. Lin and G. P. Theofilos. Oct 62, 43p.
RR138
Contract AF19 604 7458, Proj. 5561, Task 556112
AFCRL 63 126 Unclassified report

Descriptors: *Gas discharges, *Hydrodynamics, Shock waves, Shock tubes, Energy, Distribution, Series, Density, Molecules, Integration, Propagation, Kinetic theory, Integrals, Differential equations, Velocity, Molecular properties, Air, Electromagnetic waves, Wave transmission, Microwaves.

An elementary theory is developed for predicting the strength of pressure waves to be expected from sudden breakdown of a gas by high-frequency electromagnetic waves in a one-dimensional geometry. It is shown that for an uncontrolled breakdown where the local field strength is not carefully matched to the instantaneous plasma condition to avoid strong reflections, the heating effect will be self-limiting and the resultant shock strength depends only on the incident wave frequency and on the initial gas density. Numerical example for microwave breakdown in air indicates that at normal sea level density, the shock wave accompanying the breakdown is generally quite weak (of the order of Mach 1.1 at 100 gc). However, for breakdown at lower air densities, stronger shock waves can be anticipated. Preliminary experimental observations of

pressure waves generated in a one-dimensional channel by pulse microwave discharges tended to confirm the general features of the elementary theory but showed somewhat stronger effects than predicted. (Author)

AD-405 830 Div. 9
(TISTP/JP) OTS price $3.50

David Taylor Model Basin, Washington, D. C.
MOTIONS OF A SPAR RAFT IN REGULAR WAVES,
by Robert Taussig. May 63, 32p.
DTMB1673 Unclassified report

Descriptors: *Spar buoys, Water waves, Hydrodynamics, Motion, Fluid dynamic properties Potential theory, Bodies of revolution.

A theoretical analysis is constructed for the hydrodynamic forces acting on a system of interconnected vertical, slender, axisymmetric bodies which are floating in presence of incident waves The theory is based on linearized water wave potential theory and the use of slender body techniques. The resulting expressions for the hydrodynamic forces are used to predict the motions of such a system. The effects of viscous damping are also estimated. (Author)

AD-405 831 Div. 9
(TISTP/MFA) OTS price $6.60

Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
SURGING MOTION AND BROACHING TENDENCIES IN A SEVERE IRREGULAR SEA,
by Otto Grim. Nov 62, 58p. 929
Contract Nonr26310, DL Proj. 004
Unclassified report

Descriptors: *Oceans, *Ships, Velocity, Nonlinear systems, Yaw, Damping, Functions, Ocean waves, Numerical analysis, Integral equations, Motion, Acceleration.

Nonlinearities are very significant for the surging motion of a ship in a following sea. Results are presently available only for the surging motion in regular following waves. The law of superposition cannot be used to treat the nonlinear surging motion in an irregular sea. Therefore, it is not possible to extend the results obtained in regular waves to predict the behavior in an irregular sea. A method to overcome these difficulties to investigate nonlinear surging motion in an irregular sea is presented. Using this method, results are obtained for nonlinear surging motion; in particular, solutions are given for the acceleration of a ship to an increased speed and for the subsequent run at that increased speed. A connection between broaching and nonlinear surging motion was presumed in previous discussions about broaching. This connection is confirmed and, furthermore, nonlinear surging motion is found to be the most important pre-condition for broaching. (Author)

AD-405 867 Div. 9
(TISTP/WH) OTS price $1.25

Harry Diamond Labs., Washington, D. C.
FLUID AMPLIFICATION. USE OF THE HYDRAULIC ANALOGY IN THE STUDY OF FLUID-INTERACTION DEVICES,
by Ralph G. Barclay, Allen A. Bowers and John G. Moorhead. 15 Apr 63, 55p. TR1098
DA5N03 01 003; Proj. 31100
Unclassified report

Descriptors: *Hydraulic systems, *Gas flow, *Abstracts, *Pneumatic systems, Fluid mechanics, Fluid flow, Compressible flow, Analysis.

The advantages of using the hydraulic analogy to study compressible gas flow in fluid interaction devices are discussed. The mathematical basis of the analogy is summarized, and limitations in its use are pointed out. Various practical aspects concerning operation of an analogy facility are reviewed. Four hydraulic-analogy studies are briefly described: subsonic diffuser performance, three-stage closed-system bistable fluid-flow amplifier performance, quantitative measurement of switching flow required by a bistable fluid amplifier, and blocked-output-channel and stream-attachment characteristics in fixed and adjustable models of bistable elements. Abstracts of seventeen references regarding the theory and application of the hydraulic analogy are given. (Author)

10. FUELS AND COMBUSTION

AD-404 883 Div. 10
(TISTM/AW) OTS price $5.60

Rocketdyne, Canoga Park, Calif.
RESEARCH IN HYBRID COMBUSTION.
Final rept., 1 Dec 61-31 Jan 63,
by T. Houser. 31 Jan 63, 45p. R5179
Contract Nonr301600
Unclassified report

Descriptors: *Combustion, *Hybrid rocket propellants, Polymers, Oxygen, Oxidizers, Pyrolysis, Temperature, Thermal conductivity, Equations, Flames, Styrene plastics, Acrylic resins.

The instantaneous surface regression rates were calculated as functions of time and axial distance from the radius vs time data obtained from plexiglas combustion. Temperature measurements of the fuel behind the regressing surface were made. Additional experiments were carried out to examine the burning rates of different fuels such as polystyrene, polyethylene, 30 and 60% aluminum, 30% titanium hydride, and 1/4 and 1/2% carbon in plexiglass. The significance of the burning rate and temperature measurement results is discussed. (Author)

AD-405 126 Div. 10
(TISTM/LMH) OTS price $6.60

Rocketdyne, Canoga Park, Calif.
RESEARCH IN THE CHEMICAL, PHYSICAL, AND METALLURGICAL SCIENCES, TASKS 1, 3, AND 4.
Rept. for 25 Dec 62-25 Mar 63.
Apr 63, 59p. R5128
Contract AF04 611 8502, Proj. 3850, Task 385004
RTD TDR63 1045
Unclassified report

Descriptors: *Rocket propellants, *Chemical analysis, Pentaboranes, Sensitvity, Electrolysis, Particles, Gases, Liquids, Hydrogen, Molecular association, Fluorine, Chromatographic analysis, Air, Electrodes, Liquefied gases, Measurement.

A feasibility study was made on the use of a membrane electrode for the detection and measurement of pentaborane in air. A number of plastic films were tested, but none were found sufficiently permeable to provide a sensitive and practical sensing device. A method is proposed to convert pentaborane to hydrogen, which may then be sensed with the membrane electrode. Experimental data are presented to demonstrate that this method affords adequate sensitivity and retains all the advantages of the membrane electrode principle. The experimental work is now in progress on the rapid and quantitative conversion of pentaborane to hydrogen. (Author)

AD-405 479 Div. 10, 30
(TISTM/EJH) OTS price $5.60

Reaction Motors Div., Thiokol Chemical Corp., Denville, N. J.
STUDY OF A TRACER METHOD FOR SOLID PROPELLANTS,
by David Fleischer. Feb 63, 43p. 5502F
Contract AF29 600 3020
ORA 63 3 Unclassified report

Descriptors: *Solid rocket propellants, *Rocket motors (Solid propellant), *Combustion, Propellant grains, Spectroscopy, Test equipment, Test methods, Photomultipliers, Spectrophotometers, Lithium compounds, Perchlorates, Thallium compounds, Sulfates, Polymers, Sulfides, Epoxy plastics, Mixtures, Tracer studies.

A photometric method for determining local burning rates in solid propellant motors is described. Metallic salt-polymer mixtures (tracers) are inserted in known locations in the motor. Resonant radiation from the vaporized metal provides light pulses in the motor exhaust. Spectrographic time resolution of these pulses and the known distances between deposits in the grain yield the burning rates. Preliminary strand experiments are used to estimate burning rates of tracer and propellant under engine conditions. These values are introduced in an expression relating accuracy of photometric burning rate to tracer thickness, separation between tracer deposits, and tracer and propellant burning rates. Tracer thickness and separation in the test engine for a desired accuracy are thus defined. Engine burning rates reproducible to ± 7% for a one centimeter separation were easily obtained. (Author)

AD-405 712 Div. 10, 26
(TISTM/EJH) OTS price $10.50

Aerojet-General Corp., Sacramento, Calif.
HYDRAZINE PROCESS DEVELOPMENT.
Interim technical engineering rept. no. 8, Feb-Apr 63,
by H. J. Snyder, H. T. Watanabe, L. G. Carpenter, R. I. Miller, R. L. Pearson and others. Apr 63, 126p.
Contract AF33 600 42996, Proj. 7 840
ASD TR7 840A Vol. 9 Unclassified report

Descriptors: *Liquid rocket propellants, *Liquid rocket fuels, *Manufacturing methods, *Organic compounds, Nuclear engineering, Homogeneous reactors, Fission products, Production, Uranium compounds, Dioxides, Ammonia, Crystal growth, Gamma rays, Decontamination, Additives, Radiolysis, Chemical equilibrium, Separation, Industrial equipment, Design, Hazards, Production, Rocket propellants.

The primary goal is to develop, design, construct and operate a continuous, in-reactor hydrazine production loop based on the fissiochemical process approach. This eighth quarterly progress report discusses product decontamination, pure hydrazine irradiation, loop component testing, UO2 crystal growth, fabrication and testing of AGN-302 experiment modules, design and hazards reports preparation, catalytic hydrogen removal, hydrazine equilibrium concentration under radiolysis, additive effects, and a natural circulation reactor system. (Author)

AD-405 726 Div. 10, 27, 12
(TISTM/PCR) OTS price $9.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
LIQUID ROCKET PROPELLANTS (Zhidkiye raketnyye topliva),
by A. V. Seregin. 23 Apr 63, 112p.
FTD TT63 98 Unclassified report

Trans. from Voyennoye Izdatel'stvo Ministerstva Oborony SSSR, Moskva, pp. 1-92, 1962.

Descriptors: *Liquid rocket fuels, *Liquid rocket oxidizers, *Liquid rocket propellants, *Rocket motors (Liquid propellant), Liquefied gases, Nitric acid, Hydrogen peroxide, Fuel systems, Pumps, Production, Transportation, Storage, Nitrogen compounds, Oxides, Corrosion, Hypergolic rocket propellants, Ozone, Fluorine, Chlorine compounds, Fluorochlorides, Boron compounds, Hydrides, Free radicals, Organic compounds, Oxygen, Diboranes, Cooling.

This book, compiled from data of the foreign literature, describes the basic properties of liquid rocket propellants and the characteristics of their application chiefly in liquid-propellant engines. The book is designed for master-sergeants, sergeants and privates of the armed forces, as well as civilians interested in the problems of rocket technology. (Author)

AD-405 887 Div. 10, 9, 27
(TISTM/ODN) OTS price $4.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
SHOCK-INDUCED COMBUSTION WITH OBLIQUE SHOCKS, COMPARISON OF EXPERIMENT AND KINETIC CALCULATIONS,
by P. M. Rubins and R. P. Rhodes, Jr. June 63, 38p.
Contract AF40 600 1000, Proj. 6952, Task 695201
AEDC TDR63 103 Unclassified report

Descriptors: *Ramjet engines, *Supersonic flow, Hydrogen, Air, Shock waves, Chemical reactions, Free radicals, Detonations, Reaction kinetics, Gas analysis, Shock (Mechanics), Theory, Combustion.

Theoretical analyses made recently have shown the advantages of supersonic combustion for a hypersonic ramjet. The present work deals with experimental investigations of shock-induced H2-air combustion in the constant pressure region aft of an oblique shock and with kinetic calculations for the H2-air reaction. Quenched gaseous components for the early parts of the chemical reaction were analyzed to determine hydrogen molecule reaction rate, and a comparison was made of the experimental H2 reaction rate with the current chemical kinetic computations. Agreement with one kinetic calculation for the H2-air reaction at constant pressure was within the experimental error, indicating the possible use of kinetics to predict hypersonic ramjet combustion performance when shock-induced combustion is used. The concept of shock-induced combustion is defined and compared with the usual conditions where detonations are observed, and it is concluded that detonations are a special case of shock-induced combustion. (Author)

11. GROUND TRANSPORTATION EQUIPMENT

AD-404 778 Div. 11
(TISTP/JEA) OTS price $8.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
OVERSNOW TRANSPORT,
by Malcolm Mellor, ed. by F. J. Sanger. Jan 63, 1v.
CRREL 3 A4 Unclassified report

Descriptors: *Snow vehicles, *Transportation, Skis, Sleds, Trafficability, Tracked vehicles, Ground effect machines, Cargo vehicles, Detection, Reliability, Mathematical analysis, Theory, Arctic tests.

Present military concepts call for highly mobile units capable of rapid dispersal and efficient movement across country where no roads exist, and many current civilian engineering tasks require movement of men and materials long distances over roadless terrain. Oversnow transport is a particular aspect of the general problem of cross-country mobility, but the characteristics of snow-covered regions are such that special techniques and equipment are required for efficient operation. In order to fully understand the action of vehicles in snow and to formulate sound design criteria, it is necessary to develop a theory which permits quantitative analysis of trafficability problems. For practical purposes, vehicle evaluation is at present made from the results of relatively simple field tests which give drawbar pull as their main indicator. The best practical evaluations are made by observing the operational capabilities of vehicles in various types of snow. (Author)

12. GUIDED MISSILES

AD-404 700 Div. 12, 30
(TISTP/JEA) OTS price $1.10

System Development Corp., Santa Monica, Calif.
1604 SIMULATION PROGRAM DESCRIPTIONS. MILESTONE II. SIMULATED VEHICLE TIME MESSAGE MAKEUP ROUTINE (SCGR),
by P. T. Kastama. 15 Mar 63, 8p. TM L734 032 00
Contract AF19 628 1648
Unclassified report

Descriptors: *Space surveillance systems, *Programming computers, Satellite networks, Controlled sequences, Operation, Input-output devices, Punched cards, Errors, Timing circuits, Time, Magnetic tapes, Simulation.

Simulated vehicle time message makeup routine will generate vehicle time messages once for every NN seconds of simulated time. Also these messages will be included on a simulation Bird Buffer - 1604 Transfer Tape, or a Bird Buffer Simulation Tape. (Author)

AD-404 730 Div. 12
(TISTE/OHD) OTS price $2.60

Martin-Marietta Corp., Baltimore, Md.
GEMINI LAUNCH VEHICLE ACCEPTANCE SPECIFICATION.
17 Apr 63, 26p.
Contract AF04 695 88
Unclassified report

Descriptors: *Launch vehicles (Aerospace), Documentation, Acceptability, Tests, Specifications.

This specification establishes the basic acceptance criteria and requirements for the Gemini launch vehicle, including requirements for supporting documentation prior to and at the time of acceptance; and general requirements for the subsystem functional verification and combined acceptance tests. This specification shall be used by the procuring activity and the contractor as the document defining the requirements for procuring activity acceptance of the Gemini launch vehicle. (Author)

AD-404 741 Div. 12, 7
(TISTE/CAM) OTS price $8.60

Friez Instrument Div., Bendix Corp., Baltimore, Md.
DESIGN, DEVELOPMENT AND FABRICATION OF BAROSWITCH, REMOTE XM-10; BAROSWITCH, PRESET XM-11; AND CONTROL BAROSWITCH SETTING: XT-4126.
Progress rept. no. 23, 1 Feb-31 Mar 63.
10 Apr 63, 1v.
Contract DA36 034ORD2890
Unclassified report

Descriptors: *Pressure switches, Electric switches, Automatic, Vibration, Test methods, Experimental data, Tables, Guided missiles, Control, Design.

Twenty-two of the 44 XM-10 baroswitches were either delivered or in drift test. The large diameter shoe is now part of the XM-10 baroswitch program. The mandatory process was written and is being reviewed. Four setters were modified to stabilize the phase angle. Connector caps, dummy receptacles and new power supply transformers are on order to complete the final modifications. The evaluation test procedure, acceptance test procedure, and the revised purchase description were completed and submitted for approval. (Author)

AD-404 744 Div. 12
(TISTA/GEC) OTS price $6.60

Air Force Inst. of Tech., Wright-Patterson Air Force Base, Ohio.
LUNAR LANDING AND TAKE-OFF,
by Peter Bielkowicz. 1963, 60p.
Proj. 62-3
AFIT TR63-2
Unclassified report

Descriptors: *Lunar probes, *Lunar craft, Take-off, Thrust, Controllable-thrust rocket motors, Numerical analysis, Gravity, Mathematical analysis, Equations, Moon, Landing.

An assumption of the uniform gravity field of the Moon was justified, by computing errors due to this assumption and by establishing the limits within which the simplified computations should be performed. Vertical take-off and ascent from the Lunar surface was analyzed for different values of a constant propellant flow. The analysis of the vertical descent and landing was extended to the cases of a constant propellant flow and thrust, to the modulated and intermittent thrust. Typical numerical examples were computed without embarking on a generalized optimization problem, but by indicating the ways of minimizing the propellant consumption. (Author)

AD-404 745 Div. 12
(TISTP/JEA) OTS price $9.60

Boeing Co., Seattle, Wash.
VAFB ACCEPTANCE/DEMONSTRATION PROGRAM PLAN,
by J. C. Hindmarch and R. V. Smith. 19 Feb 63, 111p. D2 13302 2
Contract AF04 647 757
Unclassified report

Descriptors: *Guided missiles (Surface to surface), *Launching sites, *Checkout procedures, Checkout equipment, Acceptability, Weapon systems, Ground support equipment, Maintenance, Handling, Test sets, Test equipment (Electronics), Test methods, Specifications.

The information and requirements presented as they apply to the assembly and checkout contractor (Boeing) meet the objectives for tech-

nical approval, inventory, acceptance, and delivery/turnover of the Minuteman Wing II WS-133A Weapon System Facilities at VAFB. The methods to be used by Boeing to modify and demonstrate the weapon system using supporting technical manuals and implement the acceptance and delivery/turnover of the weapon system to the procuring authority was described. The remaining facilities under SAC control requiring modification (e.g. SMSA) will be modified by the use of a separately negotiated time compliance technical order and will not be included. The delivery/turnover activities described also pertain to only the Wing II LF(s) since the Wing II supporting facilities which were not yet in SAC's custody will remain in the custody of Boeing at the end of the Wing II Program in order to support the Wing III Program. (Author)

AD-404 747 Div. 12, 7, 13
(TISTP/JEA) OTS price $1.60

Boeing Co., Seattle, Wash.
TECHNICAL SPECIFICATIONS - ELECTRICAL SURGE ARRESTER INSTALLATION - WARREN AIR FORCE BASE,
by P. Waldron. 19 May 63, 16p. D2 14351
Contract AF04 694 107
Unclassified report

Descriptors: *Electrical equipment, *Specifications, *Guided missiles (Surface to surface), Electrical connectors, Standards, Materials, Cleaning, Electric wire, Torque couplings, Welding, Tolerances (Mechanics), Abrasives, Installations, Weapon systems.

AD-404 753 Div. 12
(TISTP/JEA) OTS price $1.60

Boeing Co., Seattle, Wash.
ACCEPTANCE REQUIREMENTS FOR REAL PROPERTY AND REAL PROPERTY INSTALLED EQUIPMENT - MINUTEMAN (SMSA)- VAFB,
by H. Furman. 28 July 61, 17p. D2 7316
Unclassified report

Descriptors: *Guided missiles (Surface to surface), *Guided support equipment, Guided missile launchers, Control systems, Training devices, Checkout equipment, Launching sites, Installations, Maintenance, Electronic equipment, Air conditioning equipment.

AD-404 766 Div. 12, 8
(TISTE/CAM) OTS price $3.60

Boeing Co., Seattle, Wash.
ELECTRO-INTERFERENCE TEST REPORT, WS-133A WING I BOEING PACIFIC TEST CENTER - DESTRUCT ORDNANCE INSTALLATION BUILDING,
by R. J. Gower. 1963, 31p. T2 2850 7
Contract AF04 647 289
Unclassified report

Descriptors: *Guided missiles (Surface-to-surface), Destructors, Explosive initiators, Electromagnetic waves, Interference, Broadband, Data, Test methods, Measurement, Tables, Circuits, Electric fields.

The purpose of this analysis is to show that the ambient electric fields present in the DPIF's are not of sufficient magnitude to cause inadvertent squib firings. Described is the analysis performed per (Electro-Interference Test Plan for the WS-133A System Destruct Package Installation Facility, DPIF). Data on Electro-interference levels present in the DPIF's were taken from data sheets, drawings and converted to Electric Field Intensity levels. Broadband voltage levels were converted to equivalent CW levels and the converted broadband CW levels were then compared with the voltage levels calculated necessary to produce 100 milliamperes through a squib. The results show that the fields present in the DPIF's are not of sufficient magnitude to induce 100 milliamperes in the squib circuits. Worst case assumptions are made in all cases. (Author)

AD-404 800 Div. 12, 6
(TISTP/JEA) OTS price $8.60

System Development Corp., Santa Monica, Calif.
AUGMENTED SATELLITE CONTROL FACILITY SYSTEM DESCRIPTION,
by S. Weems. 1 Apr 63, 93p. TM1146 000 00
Contract AF19 628 1648
Unclassified report

Descriptors: *Space surveillance systems, *Satellite networks, *Radar tracking, *Command and control systems, Digital systems, Telemeter systems, Analog systems, Scheduling, Control sequences, Data storage systems, Communication equipment, Digital computers, Radar stations, Computer storage devices, Computer logic, Selection, Multiple operation, Data processing systems, Satellites (Artificial).

The description of the Augmented Satellite Control Facility (SCF) is approached from two points of view: first, the equipment subsystems are described in terms of their capabilities, functions, and primary usages; second, the principal activities performed by the SCF; i.e., telemetry, tracking, commanding, and scheduling are explained in such a way that the previously described equipments are tied together into systems, with emphasis on the functional aspects of SCF operations. The SCF is composed of a central control station called the Satellite Test Center (STC) and six remote tracking stations, three of which have limited dual capability. The STC is equipped to support six satellites simultaneously. Its data processing subsystems are divided into two main functional groupings: one, the 'Bird Buffer complex,' is vehicle oriented, and has eight CDC 160A computers, each of which can be individually assigned to an active satellite as a buffer; the other grouping is the off-line-computer complex, which uses four CDC 1604 computers to do the main computational chores for the system. (Author)

AD-404 817 Div. 12
(TISTP/JEA) OTS price $9.10

Boeing Co., Seattle, Wash.
THE MIL-I-6051 TEST D2-6004-5 VOLUME 1, ON GTM 004C IN MAB 2.
Test rept.,
by F. E. Geozi. 2 Apr 62, 107p. T2 2279
Contract AF04 647 289
Unclassified report

Descriptors: *Computers, *Monitors, *Checkout equipment, *Interference, Guided missiles (Surface to surface), Ground support equipment, Test equipment (Electronics), Operation, Programming languages, Computer logic, Calibration, Hazards, Analysis, Reliability, Tolerances (Mechanics).

AD-404 827 Div. 12, 30
(TISTP/JW) OTS price $4.60

Stanford U., Calif.
A CENTRIFUGAL HYPERSONIC WIND TUNNEL FACILITY

FOR INVESTIGATING EFFECTS OF INERTIA ON ABLATING BODIES,
by J. S. Ford and W. H. Horton. Mar 63, 39p.
SUDAER 151
Contract Nonr22530

Unclassified report

Descriptors: *Hypersonic wind tunnels, Ablation, Gas flow, Motion.

Attention is drawn to the significant effect of inertial loads experienced during re-entry on the process of ablation. It examines the feasibility of creating a ground-test facility in which re-entry deceleration can be simulated in a high velocity, high enthalpy gas flow. The conclusion is reached that a centrifuge mounted, electric arc heated, hypersonic tunnel can be developed with the necessary capability for studies over a wide range of re-entry trajectories. The essentials of such a design are presented. (Author)

AD-404 839 Div. 12
(TISTP/JEA) OTS price $5.60

McDonnell Aircraft Corp., St. Louis, Mo.
ENGINEERING DATA FOR GROUND SUPPORT EQUIPMENT, VOLUME I, GAM-72,
by C. L. Moore. 15 July 58, rev. 30 Jan 63, 1v.
6170
Contract AF33 600 29850

Unclassified report

Descriptors: *Ground support equipment, *Guided missiles (Air to air), *Indexes, Adapters, Cables (Mechanical), Meters, Test equipment (Electronic), Electrical equipment, Specifications, Military requirements, Ground support equipment.

AD-404 844 Div. 12, 13
(TISTE/OHD) OTS price $3.50

General Electric Co., Philadelphia, Pa.
A FOOD REFRIGERATION AND HABITABLE ATMOSPHERE CONTROL SYSTEM FOR SPACE VEHICLES, DESIGN, FABRICATION, AND TEST PHASES.
Report for 10 Mar 61-10 Apr 62,
by R. A. Miller and S. Halpert. Dec 62, 198p.
Contract AF33 616 6902, Proj. 6373, Task 637303
AMRL TDR62 149

Unclassified report

Report on Equipment for Life Support in Aerospace.

Descriptors: *Refrigeration systems, *Controlled atmospheres, Food, Life support, Space environmental conditions, Design, Thermal radiation, Mathematical analysis, Temperature, Radiators, Moisture, Spacecraft.

The purpose of this development project was to design, fabricate, and evaluate a food refrigeration and habitable atmosphere control system which will support a three-man crew for an extreme altitude mission of 14 days and have additional capabilities for the storage, heating and chilling of recovered water. The feasibility study and design study phases of the program indicated that a flight optimized system (i.e., a system with minimum power, weight, and volume characteristics) would be a system which utilizes a direct radiation to space concept to remove excess heat from the confines of a space vehicle. The equipment and systems were fabricated to assure their operability under the following extremes of environment: (1) cabin pressure will vary between 0.5 to 1.0 atmosphere, (2) equipment must operate in the presence of normal gravitational conditions as well as under a weightless condition, and (3) acceleration forces of up to 8 G's must be withstood. (Author)

AD-405 056 Div. 12, 27
(TISTP/FEM) OTS price $9.60

General Electric Co., Cincinnati, Ohio.
DYNAMIC SHAFT SEALS IN SPACE.
Quarterly proj. status rept. no. 4 for period ending 15 Apr 63.
15 Apr 63, 100p.
Contract AF33 657 8459

Unclassified report

Descriptors: *Rotary seals, *Seals (Stoppers), Liquid metals, Potassium, High-temperature research, Pressure, Maintainability, Life expectancy, Tests, Rings, Design, Lubricants, Test methods, Partial differential equations, Reynolds number, Couette flow, Laminar flow, Turbulence, Shafts, Space environmental conditions.

AD-405 109 Div. 12
(TISTP/FEM) OTS price $8.10

Aerospace Corp., Los Angeles, Calif.
LANDING SITE COVERAGE FOR ORBITAL LIFTING RE-ENTRY VEHICLES,
by R. G. Stern and S. T. Chu. 1 Apr 63, 82p.
TDR169 3530 10 TN1
Contract AF04 695 169
SSD TDR63 97

Unclassified report

Descriptors: *Reentry vehicles, *Spacecraft, Aerodynamic characteristics, Flight paths, Control, Trigonometry, Equations, Maneuverability, Inclined orbit trajectories.

The problem of landing site coverage of orbiting vehicles with maneuvering capability is analyzed in this report. The first part deals with the determination of the latitude coverage of a landing site per orbital period for the re-entry vehicle with a given maneuver capability defined by a rectangularly shaped landing footprint. The second part relates the required latitude coverage to guarantee that within a specific waiting time in orbit the vehicle would attain a position from which it could be deboosted from orbit and subsequently land at a preselected location. Extensive numerical results are obtained and presented in convenient graphical form. (Author)

AD-405 110 Div. 12
(TISTP/MEA) OTS price $6.60

Space Technology Labs., Inc., Redondo Beach, Calif.
MINUTEMAN WING I ENVIRONMENTAL CONTROL SYSTEM RELIABILITY ANALYSIS REPORT,
by E. J. Gearhart. 1 Nov 62, 62p. 6120J894RU000
Contract AF04 647 689
BSD TDR62 336

Unclassified report

Descriptors: *Guided missiles (Surface to surface), *Control systems, *Cooling and ventilating equipment, *Air intake filters, Cooling fans, Handling, Guided missile launchers, Cooling, Air, Ventilation fans, Ventilation ducts, Redundant components, Reliability, Silos, Air conditioning equipment.

An evaluation of environmental control system reliability data for Air Force Minuteman Wing I is presented. The data submitted by American Air Filter Co., are found to be a fair estimate of mean time between failures (MTBF), although modifying factors were not always applied. The data

supplied by Holladay and Westcott were found to be unrealistic, mainly because not all sources of data were considered. Recommendations for system upgrading are made by STL for future wings of the Minuteman Program. These recommendations include such things as overdesign allowances, redundancy, use of best equipment, complete failure reporting, and use of modifying factors for correct determination of MTBF. (Author)

AD-405 121 Div. 12
(TISTP/MH) OTS price $10.10

Air Force Special Weapons Center, Kirtland Air Force Base, N. Mex.
PACIFIC MISSILE RANGE TRAJECTORIES,
by Lawrence C. Callaway. Feb 63, 121p.
Proj. 627A000
AFSWC TDR63 25

Unclassified report

Descriptors: *Trajectories, Ballistics, Guided missile trajectories, Velocity, Flight paths, Rocket trajectories, Reentry vehicles, Atmosphere models, Drag, Free-flight trajectories, Programming, Guided missile ranges.

Included in this report are studies of ballistic trajectories for a point mass moving in three degrees of freedom relative to a rotating oblate earth. All trajectories are launched from Vandenberg AFB, California to points of interest in the Pacific Missile Range. A running account of the position, forces exerted on the vehicle, and atmospheric information is given throughout the trajectory with a more detailed account given from reentry into the atmosphere to impact. Vernier Engine Cut-Off (VECO) occurs at the same range from Vandenberg AFB (423.45 nautical miles) and at the same altitude (1,086,502 feet) for all five trajectories. Velocity, flight path angle, and heading angle were varied at VECO for each trajectory to achieve impact in the desired areas. Since it was desired to achieve a 20 degree reentry angle, these trajectories do not represent minimum energy trajectories. Reentry is considered to occur between the altitudes of 300,000 and 400,000 feet. The Standard ARDC 1959 Atmosphere Model was used in computing these trajectories. (Author)

AD-405 163 Div. 12
(TISTP/JEA) OTS price $1.10

Martin Marietta Corp., Denver, Colo.
POST FIRING CAPTIVE TEST REPORT. MISSILE SM68B-27. MISSILE VERIFICATION FIRING,
by H. W. Campbell. 13 May 63, 6p. CR63 114
Contract AF04 694 213

Unclassified report

Descriptors: *Firing tests, *Guided missile (Surface-to-surface), *Captive tests, *Rocket motors (Liquid propellant), Operation, Hydraulic systems, Checkout procedures, Oxidizers, Pumps, Seal (Stoppers), Specifications, Reliability, Hydraulic accumulators, Hydraulic actuators, Guided missile simulators.

AD-405 572 Div. 12, 14
(TISTM/BRW) OTS price $4.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
PROGRAM 461 RELIABILITY MATERIALS RESEARCH AND APPLICATION EVALUATION OF BEARING MATERIALS AND LUBRICANTS FOR SPACE ENVIRONMENT.
Final rept.
Apr 63, 1v. A065438
Contract AF04 647 787

Unclassified report

Descriptors: *Ball bearings, *Lubricants, Space environmental conditions, Oils, Greases, Films, Molybdenum compounds, Sulfides, Metal films, Plastics, Silver, Plating, Petroleum, Silicon compounds, Effectiveness, Tests, Low pressure research, Nylon, Paper, Phenolic plastics.

The best operating lifetimes in a vacuum were achieved with oil and grease lubricants. Of the 37 tests conducted with 28 oils, double-shielded bearings with vacuum impregnated paper base phenolic retainers lubricated with 4 oils (one low-volatility petroleum base oil and 3 halogenated silicones) gave lifetimes of over 1 year. Of 13 greases evaluated in 16 tests, 4 greases, composed of silicone oils in shielded bearings showed lifetimes of over 1 year. On the basis of coast times, torque was about the same for oil-lubricated bearings with phenolic retainers as for the grease-lubricated bearings with metal-ribbon retainers. Of the total oil tests in a vacuum, 1 oil (Apiezon K) has achieved 18,297 hours of test time and is still running. Of the total grease tests in a vacuum, 1 grease (Aeroshell-15) has achieved 13,364 hours and is still running. Of the 29 tests conducted, on different dry-film lubricants, 15 showed poor reproducibility and all had limited lifetimes under a 100% duty cycle. The maximum lifetime achieved was 2,213 hours. However, similar tests on the same material gave test times of 876, 245, 342, and 132 hours. Eight self-lubricating retainer materials were evaluated in 19 tests. Two polytetrafluoroethylene compositions gave the best results: 5,000 and 3,000 hours. (Author)

AD-405 674 Div. 12, 26
(TISTE/CAM) OTS price $4.60

Boeing Co., Seattle, Wash.
WEIGHT AND BALANCE STATUS REPORT - WING VI,
by P. F. Labes. 10 May 63, 41p. D2 30147 2
Contract AF04 694 266

Unclassified report

Descriptors: *Guided missiles (Surface to surface), Load distribution, Guided missile components, Design, Tables, Weight.

AD-405 699 Div. 12, 6
(TISTA/GEC) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ON THE ADJUSTMENT OF ARTIFICIAL EARTH SATELLITE POSITIONS TO STARS,
by B. N. Himmelfarb. 22 Apr 63, 6p.
FTD TT62 1885

Unclassified report

Trans. from Russian Periodical, Byulleten' Stantsiy Opticheskogo Nablyudeniya Tskusstv. Sputnikov Zemli, No. 10, pp. 8-10, 1960.

Descriptors: *Satellites (Artificial), Stars, Astronomy, Position finding, Instrumentation, Astronomical data, Telescopes, Optical tracking.

A method is described of adjusting the position of the Artificial Earth Satellites to stars which was based on drawing the daily parallels of stars based on the observation of their transit through the lines of the reticle in the field of view of tube AT-1 and on determining the differences of the coordinates of these stars and the point at which the intersection of the sputnik was made. (Author)

Division 12 - GUIDED MISSILES

AD-405 728 Div. 12, 7, 8
(TISTA/GEC) OTS price $8.10

Rocketdyne, Canoga Park, Calif.
ELECTROINTERFERENCE EVALUATION OF THE ATLAS MA-5 ELECTRICAL SYSTEM.
15 May 63, 81p. R3994
Contract AF04 694 135

Unclassified report

Descriptors: *Guided missiles (Surface-to-surface), *Electrical networks, Electromagnetic waves, Noise (Radio), Frequency, Rocket motor (Liquid propellant), Radiointerference, Interference.

The results of radio noise tests performed on the Atlas MA-5 electrical system are presented. Conducted interference measurements using a stabilization network were made from 150 kilocycles to 25 megacycles. Conducted interference measurements using a current probe were made from 30 cps to 25 megacycles. Radiated interference measurements were made in the frequency range of 15 kilocycles to 400 megacycles. The MA-5 engine electrical system is within specification limits between 30 and 15 kilocycles in the conducted interference portion of the test. In other portions of the test, the interference levels measured varied, with the majority of the measurements above specified limits. (Author)

AD-405 756 Div. 12
(TISTA/LSK) OTS price $9.10

Boeing Co., Seattle, Wash.
WS-133A MAINTAINABILITY PROGRESS REPORT.
Monthly progress rept. no. 3, Feb 63,
by Earl Hardy. 25 Mar 63, 105p. D2 14934 3
Contract AF04 648 289

Unclassified report

Descriptors: *Launching sites, Instrumentation, Silos, Guided missiles (Surface-to-surface), Ground support equipment, Command and control systems, Maintenance.

This document is the third of the monthly reports that outline the progress achieved by the contractor in the WS-133A Maintainability Program. The Maintainability Program Plan for the Minuteman Weapon System is two-fold; it provides both a Design Review and Evaluation Plan and a Test and Demonstration Plan. The monthly reports contain status of progress and problem areas encountered in each of these plans. (Author)

AD-405 757 Div. 12, 30, 13
(TISTA/LSK) OTS price $13.00

Boeing Co., Seattle, Wash.
LAUNCH CONTROL SYSTEM TEST PROCEDURES, NETWORK RESOLUTION AREA (NRA),
by D. D. Uhrich. 22 June 62, 188p. D2 13406, V1
Contract AF04 647 289

Unclassified report

Descriptors: *Launching sites, Checkout equipment, Instrumentation, Test methods, Test equipment, Checkout procedures, Guided missiles (Surface-to-surface), Resolution, Command and control systems, Ground support equipment.

The purpose and scope of the Network Resolution Area (NRA) Program are described. Detailed descriptions of test organization, test configuration and test objectives are given. All signals will be monitored at the rack level missile or at ground support test points provided on the front of the Sensitive Command Network (SCN) equipment drawers. Parallel inputs are provided for all SCN Command Receive channels at the patch panel, to facilitate monitoring of signals received at the nodes. The NRA Instrumentation System will be used extensively for monitoring test signals. Replay of the instrumentation tape will be recorded on oscillograph paper and the results evaluated for use in NRA Test Reports. (Author)

AD-405 771 Div. 12, 25, 9, 8, 30
(TISTE/OHD) OTS price $5.60

Pennsylvania State U., University Park.
ANALYTICAL MODEL OF TRANSIENT MISSILE BEHAVIOR BY MEANS OF ELECTRICAL NETWORK ANALOGIES.
Final summary rept., 29 July 61-29 July 62,
by Carl Volz and W. S. Adams. 15 Dec 62, 52p.
Contract DA36 034ORD3513RD, Proj. 516 01 004

Unclassified report

Descriptors: *Electrical networks, *Guided missile models, Mathematical models, Nonlinear systems, Guided missile trajectories, Mathematical analysis, Differential equations, Partial differential equations, Models (Simulations).

The purpose of the investigation was to determine the feasibility of obtaining an electrical circuit whose behavior would be a satisfactory analog of the dynamics of a missile in flight. It was also hoped to find a mathematical procedure for analyzing the analog circuit which would allow analysis of the missile system by analogous responses. Due to the severity of the non-linearity this was not possible. Because of the nature and importance of the stability problem in non-linear systems, it was recommended that the analysis of the missile system be accomplished by utilizing an active electrical analog simulator arranged specifically for solution of the set of behavior equations representing missile dynamics including wind profile forcing functions. A study was made of the various devices which could be used to perform the circuit operations involved. This study leads to the belief that the most practical simulator would be composed of standard analog components. (Author)

AD-405 813 Div. 12, 15, 25, 19
(TISTP/JEA) OTS price $6.60

RAND Corp., Santa Monica, Calif.
AN OPTIMAL LINEAR FEEDBACK GUIDANCE SCHEME,
by Stuart E. Dreyfus and Jarrell R. Elliott.
May 63, 43p. RM3604PR
Contract AF49 638 700

Unclassified report

Descriptors: *Guidance, *Feedback, Orbital trajectories, Flight paths, Numerical methods and procedures, Control systems, Linear systems, Matrix calculus, Velocity, Guided missile trajectories, Theory, Spaceborne, Partial differential equations.

A theory developing a linear feedback guidance scheme to correct for inflight disturbances of a vehicle during the course of a space mission is presented. The theory is predicated on the use of a nominal optimal trajectory. The scheme consists of a linear combination of: (1) perturbations of the vehicle state from its nominal state; and (2) time-varying gains to determine the control correction required to satisfy the constraints of the trajectory in an optimal fashion. Exact knowledge of the state of the vehicle is assumed. An analysis of numerical results for an idealized rocket trajectory problem shows the linear feedback guidance scheme to be effective over a wide range of chosen perturbations. (Author)

AD-405 841 Div. 12
(TISTP/JEA) OTS price $4.60

Boeing Co., Seattle, Wash.
SITE ACCEPTANCE TEST PROCEDURES MINOT AFB.
22 Mar 63, 47p. D2 9262 V12
Contract AF04 694 107

Unclassified report

Descriptors: *Launching site, *Checkout procedures, *Guided missile (Surface to surface), Ground support equipment, Checkout equipment, Test methods, Control systems, Maintenance, Guided missile safety.

Acceptance tests are specified which are required for the checkout of equipment assembled into a Minuteman Missile System at Minot AFB preparatory to the eventual acceptance of the Flights, Squadrons and the entire Wing. Procedure documents required for the certification of Assembly and Checkout (ACO) test equipment as well as the documents required for checkout of OGE and MGE equipment are called out. (Author)

13. INSTALLATIONS AND CONSTRUCTION

No Entries

14. MATERIALS (NON-METALLIC)

AD-404 742 Div. 14, 12
(TISTM/PCR) OTS price $3.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
RESPONSE OF CHARRING ABLATORS TO HYPERTHERMAL ENVIRONMENT,
by R. D. Mathieu. Feb 63, 32p. R63SD20
Contract AF04 647 617
Unclassified report

Descriptors: *Ablation, Mathematical analysis, Equations, Temperature, Density, Gases, Pressure, Permeability, Porous materials, Porosity, Degradation, Plastics, Momentum, Energy, Equations of state, Pyrolysis, Heat, Specific heat, Thermal conductivity, Molecular weight, High temperature research, Reentry vehicles, Thermal insulation, Materials.

A study is made of the thermal response of charring ablators to given environmental conditions. The heat protective materials considered form gases and a porous char as they undergo thermal degradation in depth. The analysis considers the transient conditions and the effect of the surface pressure on the gas pressure build-up within the porous char. The effects of porosity and permeability are included. Results of the temperature, material density, and gas pressure distribution through the heat protective layer are presented for a typical charring material. Two cases are considered: in the first case, the material undergoes one degradation reaction; in the second case, the material undergoes two successive reactions. The inclusion of char removal can also be accomplished by this study. (Author)

AD-404 776 Div. 14, 25
(TISTM/ODN) OTS price $8.10

Laboratory for Insulation Research, Mass. Inst. of Tech., Cambridge.
HIGH-DIELECTRIC-CONSTANT MATERIALS AND FERROELECTRICITY.
Final rept.,
by A. von Hippel. Mar 63, 79p. TR178
Contract AF19 604 6155, Proj. 5633, Task 563302
AFCRL 63 92
Unclassified report

Descriptors: *Ferroelectricity, *Single crystals, *Crystal growth, *Dielectrics, Strontium compounds, Barium compounds, Titanates, Ceramic materials, Dielectric properties, Spectra (Infrared), Thermodynamics, Crystal structure, Molecular properties, Quantum mechanics, Impurities, Laboratory equipment, Synthesis (Chemistry), Laboratory furnaces, Hot working, Dies, High-temperature research, Grain structures (Metallurgy), Sintering, Calcium compounds, Crystal lattices, Chemical bonds, Theory, Materials.

This final report sums up the advances made during a three year study in: theoretical understanding of the onset and frequency response of ferroelectricity; techniques of growing single crystals and preparing ceramics of reproducible properties; chemical analysis and synthesis of high-dielectric-constant materials; effects of cation substitution; measurement techniques; and the interpretation of optical and electric spectra and conduction phenomena. (Author)

AD-404 816 Div. 14
(TISTM/TCG) OTS price $1.10

Scripta Technica, Inc., Washington, D. C.
POLYMERIZATION OF BIS(2-CHLOROETHYL) VINYLPHOSPHONATE. (Polimerizatsiya di-beta, beta'-khloretilovog-o efira vinilfosfinovoy kisloty),
by V. A. Orlov and O. G. Tarakanov. May 63, 3p.
BUSHIPS T816
Unclassified report

Trans. from Plasticheskiye massy, No. 4, pp. 6-8, 1962.

Descriptors: *Vinyl plastics, *Polymerization, *Organic compounds, Molecular weight, Viscosity, Inhibition, Humidity, Temperature, Additives, Reaction kinetics, Synthesis (Chemistry).

The block polymerization of bis(2-chloroethyl)-vinylphosphonate (BCVP) in the presence of various initiators was investigated. A plot was made of the variation of the initial rate of polymerization with the temperature, and with the concentration of azoisobutyrodinitrile. The total activation energy for the polymerization of BCVP was calculated. The dependence of the polymerization rate of BCVP on the presence of atmospheric oxygen and humidity was demonstrated. The molecular weights of the polymers of BCVP were determined. (Author)

AD-404 824 Div. 14
(TISTM/PCR) OTS price $1.10

Armour Research Foundation, Chicago, Ill.
PREPARATION AND EVALUATION OF NEW HYDRAULIC FLUIDS.
Progress rept., 28 Mar-27 Apr 63,
by Irvine J. Solomon. 27 Apr 63, 5p. C6001 5
Contract NObs88249
Unclassified report

Descriptors: *Hydraulic fluids, *Organic sulfur compounds, Synthesis (Chemistry), Fluorination, Chemical reactions, Fluorides.

The purpose of this project is to develop new fire-resistant hydraulic fluids based on fluorinated, sulfur-containing compounds. The compounds will be synthesized specifically to meet the critical property requirements. Various derivatives of sulfur hexafluoride and other fluorinated materials are being investigated. The program consists of four phases: Simon's cell fluorinations, fluorinations with metallic fluorides, addition of sulfur-chloride pentafluoride to olefins, and determination of physical and chemical properties. (Author)

AD-404 886 Div. 14
(TISTM/LMH) OTS price $4.60

Trinity Coll., Dublin, (Eire).
AN INVESTIGATION OF CERTAIN WEST INDIAN HARDWOODS.
Final technical rept., 1 Feb 62-31 Jan 63,
by Wesley Cocker. Feb 63, 43p. FTR3
Contract DA91 591EUC2158
Unclassified report

Descriptors: *Wood, Wood pulp, Synthesis, Phenolic plastics, Chromotographic analysis, Acids, Chemical analysis, Stereochemistry, Waxes, Processing.

The following hardwoods were investigated: Andira inermis, Araucaria cunninghamii, Copaifera officinalis, Julbernardia globiflora, Lonicera

periclymenum, Manilkara bidentata, Shorea meranti, Simaruba amara, Symphoricarpus rivularis, Tabebuia pentaphylla, Ulex europaeus, and Vitex divaricata. (Author)

AD-405 032 Div. 14, 26
(TISTM/PCR) OTS price $1.10

Aerospace Information Div., Washington, D. C.
THE PROBLEM OF CERMET DEPLETION BY HIGHLY VOLATILE COMPONENTS DURING HEATING IN A VACUUM,
by N. A. Popov and V. I. Rakhovskiy.
16 May 63, 8p.
AID T63 72 Unclassified report

Presented at the Conference on Heat and Mass Exchange sponsored by the Belorussian Academy of Sciences, the Ministry of Higher and Secondary Special Education USSR, the Academy of Construction and Architecture USSR, and the Institute of Mechanics, Academy of Sciences USSR, Minsk, 1961

Descriptors: *Cermets, Heating, Vacuum furnaces, Molybdenum, Tungsten, Tungsten alloys, Silver alloys, Copper alloys, Vacuum switches, High-temperature research, Heat treatment, Evaporation, Manufacturing methods, Degradation.

AD-405 146 Div. 14, 17, 25, 2
(TISTP/MFA) OTS price $6.60

Northwestern Technological Inst., Evanston, Ill.
HIGH VELOCITY DISLOCATIONS.
Final rept.,
by J. Cotner, A. Van Hull, and J. Weertman.
Oct 62, 70p.
Contract AF29 601 4343, Proj. 5776, Task 577601
AFSWC TDR62 120 Unclassified report

Descriptors: *Crystals, *Crystal lattice defects, Metallic crystals, Crystal structure, Isotropism, Anisotropy, Symmetry (Crystallography), Velocities, Damping, Sound, Iron, Lithium, Sodium, Potassium, Tungsten, Molybdenum, Halides, Cesium compounds, Rubidium compounds, Brass, Bromides, Iodides, Partial differential equations, Nickel, Lead, Gold, Aluminum, Copper, Silver, Shear stresses, Analysis.

The elastic displacement field of moving edge dislocations in anisotropic body-centered-cubic and face-centered-cubic crystals is found. From the elastic displacements the shear stress on the dislocation slip plane is determined. The anomalous velocity range in which edge dislocations of like sign attract one another has been calculated for a number of metals and ionic crystals. It is found that anisotropy does not appreciably expand the anomalous range. The problem of dislocation moving on the interface separating media of different elastic properties has been considered. The anomalous velocity range may or may not exist, depending on the values of the elastic constants in the two media. The dislocation self-energy is infinite at the slowest sound velocity. Supersonic dislocation behavior is qualitatively described. (Author)

AD-405 175 Div. 14, 32
(TISTM/ODN) OTS price $4.00

Defense Documentation Center, Cameron Station, Alexandria, Va.
LUBRICANTS AND LUBRICATION; A REPORT BIBLIOGRAPHY
Bibliography for 1941-1963,
comp. by Thomas C. Goodwin and Owen D. Nichols.
June 63, 1v.
Unclassified report

Descriptors: *Abstracts, *Bibliographies, *Lubricants, *Lubrication, Airplane engine oils, Antifriction bearings, Antiseize compounds, Ball bearings, Bearings, Cutting fluids, Gas bearings, Greases, Journal bearings, Lubricant additives, Roller bearings, Gyroscopes, Thrust bearings, Friction, Low temperature lubricants, Instrument greases, Space environmental conditions.

A comprehensive bibliography, with abstracts, on lubricants and lubrication is presented. References span from 1951 to 1963 and are restricted to those in the DDC unclassified, unlimited collection. Approximately 900 references are cited. Emphasis was placed on lubricant applications, with broad coverage. A classified version of this bibliography will appear as a separate document.

AD-405 568 Div. 14
(TISTM/ODN) OTS price $1.10

Institute of Polymer Research, Polytechnic Inst. of Brooklyn, N. Y.
IMPROVEMENT OF THERMAL STABILITY OF TEXTILE FIBERS.
Final rept., 1 July 61-30 June 62,
by F. R. Eirich, P. G. Assarsson and W. M. Lee.
30 June 62, 27p.
Contract N140 138 72225
Unclassified report

Descriptors: *Fibers (Synthetic), *Textiles, *Nylon, *Fire resistant textiles, *Organic compounds, Stability, Thermal stresses, Copolymerization, Polymerization, Coatings, Processing, Chemical reactions, Flames, Melting, Protective treatments.

Improvements on, or alternatives to, the acrylonitrile melt retarding process were sought by three different approaches. First, trying to crosslink with halo-phosphorous compounds, and thus to combine melt and flame retardation holds excellent promise for an alternative process of meltproofing, but has not been found practical for flameproofing. Second, coating by interfacial polymerization. Time was not sufficient to elaborate all the many angles of this group of reactions. It was established that the basic method can be applied on a laboratory scale and does lead to meltproofing. An elaboration of this approach with a view to achieving simultaneous flame retardation is highly indicated. Finally, reactivating melt-retarding coatings for the anchorage of flameretarding agents. Promising leads uncovered were the copolymerization of acrylonitrile with methacryloylchloride, though the subsequent steps of anchoring a suitable chemical to the active acid chloride site has not been worked out. (Author)

AD-405 570 Div. 14
(TISTM/ODN) OTS price $1.75

Textile Research Inst., Princeton, N. J.
THERMAL CHARACTERISTICS OF COATED TEXTILE FABRICS.
Progress rept. nos. 7 and 8 (Final), 1 July 60-1 Sep 61,
by Robert F. Schwenker, Jr., Robert K. Zuccarello, and Louis R. Beck, Jr. 29 Mar 63, 40p.
Contract N140 138 67979
Unclassified report

Descriptors: *Textiles, *Rubber coatings, *Nylon, *Cotton textiles, Elastomers, Synthetic

rubber, Butyl rubber, Chromatographic analysis, Stability, Pyrolysis, Coatings, Decomposition, Gravimetric analysis, Heat, Protective treatments.

An apparatus for thermogravimetric analysis (TGA) is described. The effects of elastomers as coatings on cotton and nylon fabrics were studied by TGA. Fabric samples were double-coated with butyl rubber, Neoprene-W and Hypalon-20. TGA curves were obtained in air and in nitrogen for all samples to include those of the separate component materials. A good correlation was found between TGA data and previously obtained DTA data. The results indicated the cotton-butyl rubber and nylon-butyl rubber systems to have the greatest thermal stability whereas the Neoprene-coated fabrics were the least stable. The most pronounced chemical interaction occurred between Neoprene and the two textile substrates. Some chemical coating interaction was indicated for the butyl rubber-coated samples with the least interaction observed where Hypalon-20 was used as the coating. The chemical interaction mechanisms were indicated to be largely nonoxidative in character. (Author)

AD-405 717 Div. 14, 26
(TISTM/AMS) OTS price $9.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
STATISTICAL THEORIES OF STRENGTH AND THEIR APPLICATION TO METALLOCERAMIC MATERIALS (SELECTED PARTS),
by G. S. Pisarenko and V. T. Troshchenko.
22 Apr 63, 102p.
FTD TT62 1765 Unclassified report

Trans. from Statistichni Teorii Mitsnosti Ta Ikh Zastosuvannya Do Metalokeramichniki Materialiv, Akademiya Nauk Ukrains'koy RSR, Vidavnitstvo Akademii-Nauk Ukrains'koy RSR, Kiev, pp. 13-19 and 40-102, 1961.

Descriptors: *Cermets, *Ceramic materials, Oxides, Carbides, Silicides, Nitrides, Borides, Graphite, Titanium compounds, Chromium compounds, Tungsten compounds, Silicon compounds, Niobium compounds, Aluminum compounds, Boron compounds, Beryllium compounds, Magnesium compounds, Zirconium compounds, Molybdenum compounds, Theory, Mathematical analysis, Powder metallurgy, Cobalt, Tantalum, Niobium, Titanium, Nickel, Molybdenum, Chromium, Experimental data, Statistical analysis, Mechanical properties.

AD-405 727 Div. 14, 17
(TISTM/AMS) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
EFFECTIVE MEANS OF COMBATTING METAL CORROSION,
by M. Trifel. 10 Apr 63, 6p.
FTD TT62 1693 Unclassified report

Trans. from Russian Periodical, Morskoy Flot, no. 7, pp. 27-28, 1961.

Descriptors: *Coatings, *Finishes and finishing, *Corrosion inhibition, Paints, Phosphate coatings, Plastic coatings, Ceramic coatings, Rubber coatings, Organic coatings, Cleaning, Electrodeposition, Calcium compounds, Oxides, Electric currents, Anodes, Test equipment, Steel, Titanium alloys, Glass, Chromium alloys, Nickel alloys, Copper alloys, Films, Brass, Bronze, Zinc, Plating, Grease, Epoxy plastics, Marine engineering, Protective treatments, Metals.

AD-405 765 Div. 14
(TISTM/ODN) OTS price $4.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
TRANSACTIONS OF THE ACADEMY OF SCIENCES OF THE UKRAINIAN SSR. INSTITUTE OF METAL CERAMICS AND SPECIAL ALLOYS. SEMINAR ON HEAT-RESISTANT MATERIALS. (SELECTED ARTICLES).
18 Apr 63, 46p.
FTD TT62 1825 Unclassified report

Trans from Trudy Akademiya Nauk Ukrayinskoyi RSR. Institut Metallokeramiki I Spetsialnykh Splavov. Seminar Po Zharostoykim Materialam, No. 6, Kiev, pp. 38-58, 64-74, 1961.

Descriptors: *Heat-resistant materials, *Symposia, Chemical properties, Chromium compounds, Carbides, Chemical analysis, Borides, Titanium compounds, Zirconium compounds, Silicides, Nitrides, Inorganic acids, Oxidation, Rare earth compounds, Solubility, Solutions, Stability, Inorganic compounds, Boron, Volumetric analysis, Titanium, Zirconium, Nitrogen, Silicon compounds, Silicon, Ceramic materials.

Contents:
Chemical properties and methods of analyzing chromium carbides
Chemical properties and methods of analyzing borides of transition and rare-earth metals
Analysis of titanium, chromium and zirconium borides
Chemical properties and analysis of some nitrides
Chemical properties and methods of analyzing certain silicides

AD-405 838 Div. 14
(TISTM/TCG) OTS price $.50

Naval Research Lab., Washington, D. C.
STUDIES ON REDUCING THE SURFACE FRICTION OF ELASTOMERS,
by H. C. Nash and E. J. Kohn. 1 May 63, 14p.
Proj. RR001 02 43 4800, Task 4533
NRL 5911 Unclassified report

Descriptors: *Elastomers, *Surface properties, *Polyethylene plastics, *Organic compounds, Plastic coatings, Synthetic rubber, Vulcanizates, Magnesium compounds, Zinc compounds, Oxides, Carbon black, Metals, Mechanical properties, Elasticity, Tensile properties, Silicone plastics, Additives, Friction, Coatings.

Methods for reducing the surface friction of elastomeric vulcanizates were investigated, and frictional data were obtained on polytetrafluoroethylene coatings sprayed from aqueous dispersions onto elastomeric vulcanizates. Compounding polytetrafluoroethylene (TFE) resing with neoprene and silicone elastomers produced vulcanizates having inferior physical properties with no decrease in surface friction. Polytetrafluoroethylene coatings on elastomer vulcanizates provided surfaces having low coefficients of friction, which adhered sufficiently well for many applications although they are not as durable as similar coatings on metal. Lower values for the coefficient of sliding friction between metal/elastomer surfaces were obtained by coating the elastomer surface with TFE than by coating the metal surface. The surface frictional characteristics of TFE coated vulcanizates were essentially independent of the hardness of the vulcanizate, in marked contrast to the behavior of uncoated elastomers. The frictional behavior of coated elastomers was virtually independent of the thickness of the elastomer substrate. (Author)

AD-405 892 Div. 14, 26
(TISTM/ODN) OTS price $2.75

Aerojet-General Corp., Azusa, Calif.
STUDY OF THE EFFECTS OF THICKNESS ON THE PROPERTIES OF LAMINATES FOR UNDERWATER PRESSURE VESSELS.
Final rept., 15 Feb 62-15 Feb 63,
by R. D. Saunders and R. L. Smith. Mar 63, 1v. 2503
Contract NObs86406, Proj. SF01 30503, Task 1025
Unclassified report

Descriptors: *Reinforcing materials, *Pressure vessels, *Laminated plastics, Test methods, Tests, Mechanical properties, Manufacturing methods, Mandrels, Cylindrical bodies, Compressive properties, Stresses, Filament wound construction, Glass textiles, Materials, Epoxy plastics, Thermal stresses, Filaments, High pressure research, Test equipment, Industrial equipment, Underwater, Thickness.

A discussion of the program and a summary of the work conducted are presented. The basic program was to study the effects of thickness on the mechanical and physical properties of fiber-reinforced plastic laminates for deep-submersible external pressure vessels. An analysis of fabrication methods investigated, and problems related to thick-walled cylinders are given. Methods of testing and test results of cylinders and rings are presented. (Author)

AD-405 893 Div. 14
(TISTM/TCG) OTS price $3.60

Borden Co., Philadelphia, Pa.
STUDY LEADING TO THE DEVELOPMENT OF REINFORCED HIGH TEMPERATURE ELASTOMERS.
Quarterly progress rept. no. 2, 1 Jan-31 Mar 63
by K. C. Tsou, S. J. Makower, R. N. Goldey and B. D. Halpern. 31 Mar 63, 30p.
Contract DA36 034AMC3791
Unclassified report

Descriptors: *Elastomers, *Synthetic rubber, *Additives, *Organic compounds, High temperature research, Polymers, Silicone plastics, Silanes, Tensile properties, Elasticity, Mechanical properties, Silicon compounds, Oxides, Asbestos, Aluminum compounds, Hydrides, Reinforcing materials, Organic compounds, others.

A comparison of trimethylsilyl and triphenylsilyl modified silicas indicate that the trimethylsilyl modified filler is more suitable for higher tensiles at high temperature without sacrificing room temperature tensile and elastic property. A comprehensive study was carried out with various nonreinforcing fillers to determine their relative usefulness for improving high temperature performance. Asbestine 3-X, a fibrous grade of talc., was chosen as the best nonreinforcing filler to obtain high tensile at 500 F. after aging at the same temperature. (Author)

AD-405 897 Div. 14
(TISTM/ODN) OTS price $1.25

General Electric Co., Cincinnati, Ohio.
HIGH STRENGTH GLASS FIBERS DEVELOPMENT PROGRAM.
Final rept.,
by D. L. Hollinger, H. T. Plant, R. F. Mulvey and T. J. Jordan. 20 May 63, 29p.
Contract NOw61 0641c
Unclassified report

Descriptors: *Glass textiles, *Composite materials, Lithium compounds, Aluminum compounds, Hydrides, Cryogenics, Tensile properties, Filament-wound construction, Stresses, Loading (Mechanics), Moisture, Production, Plastic coatings, Mandrels, Controlled atmospheres, Liquefied gases, Nitrogen, Tests, Solutions, Silicon compounds, Test equipment, Epoxy plastics, Experimental data, Mechanical properties.

The influence of moisture on the effective strength of E-glass fibers, both as single monofilaments and when incorporated with epoxy resin into filament-wound ring structures, was investigated. Humidity in the atmosphere surrounding the fiber was controlled during various periods in its history. Split ring tensile tests on the composites showed a definite advantage for the maintenance of dry surroundings throughout all processing steps. Work with single bare fibers of E-glass served to verify the importance of this stress corrosive reaction. By conducting tensile tests at liquid nitrogen temperature (-196 C), the reaction rate was reduced essentially to zero with a resulting change in average fiber strength from 507,000 psi at room temperature to 814,000 psi at -196 C. At the low temperature, 25% of the fibers exceeded 900,000 psi and values as high as 974,000 psi were recorded. (Author)

15. MATHEMATICS

AD-404 716 Div. 15, 30
(TISTP/FEM) OTS price $11.50

California U., Los Angeles.
Nth ROOT COMPUTING METHODS,
by David F. Martin. Apr 63, 153p. 63 18
Contract Nonr23352
Unclassified report

Descriptors: *Algebras, *Programming (Computers), Computer logic, Digital computers, Least squares method, Integrals, Numbers, Functions, Transformations (Mathematics), Errors, Polynomials, Bessel functions, Binomials.

Five main classes of nth rooting methods are discussed. An nth rooting method derivable from the binomial series expansion is developed, and both restoring and nonrestoring versions are treated. For the special case of the binary square root, a nonrestoring version of this method using normalized remainders is simulated and a statistical timing distribution obtained. Other nth rooting methods discussed are a truncated series method, Euler iteration formulae, extensions of a square root method given by M. Nadler, Pade approximations and the log-exponential method. A particular mechanization of the log and exponential functions developed by Cantor, Estrin, and Turn is compared timewise with the other nth rooting methods. Hardware and storage requirements are considered in all cases. (Author)

AD-404 890 Div. 15
(TISTP/MFA) OTS price $6.60

Applied Mathematics and Statistics Labs.,
Stanford U., Calif.
NOTES ON FOURIER ANALYSIS AND SPECTRAL WINDOWS,
by Emanuel Parzen. 15 May 63, 61p. TR48
Contract Nonr22521, Proj. NR042 993
Unclassified report

Descriptors: *Series, *Fourier analysis, Polynomials, Periodic variations, Least squares method, Statistical analysis, Analysis.

A systematic development of some basic ideas

about Fourier analysis and spectral windows is presented in order to have a convenient reference for results to be used in other work on statistical spectral analysis. (Author)

AD-404 896 Div. 15
(TISTP/MFA) OTS price $3.60

Applied Mathematics and Statistics Labs., Stanford U., Calif.
THE FUNCTION SPACE POINT OF VIEW IN TIME SERIES ANALYSIS,
by Emanuel Parzen. 29 Mar 63, 37p. TR47
Contract Nonr22521, Proj. NR042 993
Unclassified report

Descriptors: *Probability, *Measure theory, Determinants, Time, Series, Distribution theory, Monte Carlo method, Functional analysis, Stochastic processes, Theory, Analysis.

AD-404 918 Div. 15, 25
(TISTP/MFA) OTS price $1.60

Redstone Scientific Information Center, Redstone Arsenal, Ala.
ON THE PLEONASMS IN THE GENERAL SOLUTION OF EQUILIBRIUM EQUATIONS OF AN ANISOTROPIC BODY IN DISPLACEMENT,
by E. N. Baida, tr. by Ingeborg V. Baker.
13 Apr 63, 17p.
RSIC 10 Unclassified report

Trans. from Izvestiya Vysskikh Uchebnoikh, Zavedenii Stro-vo I Arkhitekt no. 1, pp. 27-37, 1959.

Descriptors: *Elastic shells, *Stresses, Determinants, Operators (Mathematics), Difference equations, Polynomials, Series, Anisotropy, Equations.

AD-405 054 Div. 15
(TISTP/GRW) OTS price $1.60

Cruft Lab., Harvard U., Cambridge, Mass.
TABLES OF THE GENERALIZED STIRLING NUMBERS OF THE FIRST KIND,
by William F. Pickard. 1 Mar 63, 4p. TR404
Contract Nonr186632, Proj. NR371 016
Unclassified report

Descriptors: *Polynomials, Numerical analysis, Numbers, Differential equations, Series, Tables.

The generalized Stirling numbers of the first kind are defined, certain of their basic properties discussed, and tables given for the square grid k = 0(1)10 and j = 0(1)10 with l = - 10(1)10. (Author)

AD-405 467 Div. 15
(TISTP/FEM) OTS price $22.25

Ballistic Research Labs., Aberdeen Proving Ground, Md.
TABLES OF ORDINARY BESSEL FUNCTIONS OF THE SECOND KIND OF ORDERS 0 THROUGH 9. VOLUME I,
by George C. Francis and Viola Woodward. Mar 63, 411p.
RDT & E Proj. 1M010501A003
BRL1197 Unclassified report

Descriptors: *Bessel functions, Probability, Statistical analysis, Special functions, Mathematics, Polynomials, Computers, Errors, Tables.

The computation and tabulation of the values of Y sub n (x) for real argument x = .001(.001)50.000 and integral order n = 0(1)9 were undertaken using the ORDVAC computer. Volumes I through V are the result: Vol. I, .001(.001)10.000; Vol. II, 10.001(.001)20.000; Vol. III, 20.001(.001)30.000; Vol. IV, 30.001(.001)40.000; and Vol. V, 40.001(.001)50.000. (Author)

AD-405 468 Div. 15
(TISTP/FEM) OTS price $22.25

Ballistic Research Labs., Aberdeen Proving Ground, Md.
TABLES OF ORDINARY BESSEL FUNCTIONS OF THE SECOND KIND OF ORDERS 0 THROUGH 9,
by George C. Francis and Viola Woodward. Mar 63, 401p.
RDT&E Proj. 1M010501A003
BRL 1197 Unclassified report

Descriptors: *Bessel functions, Probability, Statistical analysis, Special functions, Mathematics, Polynomials, Computers, Errors, Tables.

AD-405 469 Div. 15
(TISTP/FEM) OTS price $22.25

Ballistic Research Labs., Aberdeen Proving Ground, Md.
TABLES OF ORDINARY BESSEL FUNCTIONS OF THE SECOND KIND OF ORDERS 0 THROUGH 9. VOLUME III,
by George C. Francis and Viola Woodward. Mar 63, 401p.
RDT & E Proj. 1M010501A003
BRL 1197 Unclassified report

Descriptors: *Bessel functions, Probability, Statistical analysis, Special functions, Mathematics, Polynomials, Computers, Errors, Tables.

AD-405 470 Div. 15
(TISTP/FEM) OTS price $22.25

Ballistic Research Labs., Aberdeen Proving Ground, Md.
TABLES OF ORDINARY BESSEL FUNCTIONS OF THE SECOND KIND OF ORDERS 0 THROUGH 9. VOLUME IV,
by George C. Francis and Viola Woodward. Mar 63, 401p.
RDT & E Proj. 1M010501A003
BRL1197 Unclassified report

Descriptors: *Bessel functions, Probability, Statistical analysis, Special functions, Mathematics, Polynomials, Computers, Errors, Tables.

AD-405 471 Div. 15
(TISTP/FEM) OTS price $22.25

Ballistic Research Labs., Aberdeen Proving Ground, Md.
TABLES OF ORDINARY BESSEL FUNCTIONS OF THE SECOND KIND OF ORDERS 0 THROUGH 9. VOLUME V,
by George C. Francis and Viola Woodward. Mar 63, 401p.
RDT&E Proj. 1M010501A003
BRL 1197 Unclassified report

Descriptors: *Bessel functions, Probability, Statistical analysis, Special functions, Mathematics, Polynomials, Computers, Errors, Tables.

AD-405 816 Div. 15, 30
(TISTP/FEM) OTS price $2.60

Israel Inst. of Tech. (Haifa).
DECOMPOSITIONS OF FINITE AUTOMATA,

by Michael Yoeli. Mar 63, 20p. TR10
Contract N62558 3510
Unclassified report

Descriptors: *Topology, *Algebraic topology, Machines, Synthesis, Transformations (Mathematics), Algebra, Matrix algebra.

The basic ideas of an algebraic decomposition theory of finite automata are presented. These ideas are generalized by also considering admissible decompositions (overlapping partitions) of finite automata. Further research is required in order to derive from the basic theory, presented in this report, efficent techniques for the synthesis of sequential machine networks. On the other hand, the extention of some of the results obtained in this report to abstract algebras in general might be of some interest. (Author)

AD-405 826 Div. 15, 8
(TISTP/JEA) OTS price $2.40

Carlyle Barton Lab., Johns Hopkins U., Baltimore, Md.
DISCRETE, FINITE REPRESENTATION OF A LINEAR, STATIONARY SYSTEM,
by P. J. Butterly. May 63, 14p.
Contract AF30 602 2597, Proj. 4505, Task 450501
RADC TDR63 124 Unclassified report

Descriptors: *Statistical processes, *Signals, Sampling, Functions, Matrix calculus, Transformation (Mathematics), Coding, Numerical analysis, Least squares method, Linear systems.

A linear system representation suitable for use with signals of finite dimensionality is described. This representation takes the form of a matrix with elements which depend both on the choice of signal basis and on the transmission properties of the system. The report is divided into two parts. Derivation of the system matrix for an arbitrary system transfer function for several widely-used signal bases and consideration for the case in which only the system matrix is known are presented. An equivalent representation, expressed in terms of a continuous parameter, is introduced to facilitate approximation of the system transfer function, and transformation formulas are established for a number of cases where they have a simple form. (Author)

AD-405 876 Div. 15, 30
(TISTP/FEM) OTS price $3.60

Michigan U., Coll of Engineering, Ann Arbor.
NORMAL MONOIDS AND FACTOR MONOIDS OF COMMUTATIVE MONOIDS,
by Yehoshafat Give'on. May 63, 38p.
05662 03105 25T
Contract Nonr122421
Unclassified report

Descriptors: *Topology, *Algebraic topology, Vector analysis, Matrix algebra, Inequalities, Numbers, Transformations (Mathematics), Factor analysis, Algebras, Metamathematics.

16. MEDICAL SCIENCES

AD-404 761 Div. 16
(TISTM/PCR) OTS price $2.25

Indiana U., Bloomington.
CUMULATIVE AUDITORY EFFECTS RESULTING FROM MULTIPLE EXPOSURE TO INTENSE ACOUSTIC STIMULATION PART I. DEAFENING EFFECTS OF NOISE ON THE CAT. Final rept.,
by James D. Miller and Charles S. Watson.
Dec 62, 75p.
Contract AF33 616 3844, Proj. 7231, Task 723101
AMRL TDR62 99, vol. 1 Unclassified report

Report on Biomechanics of Aerospace Operations.

Descriptors: *Deafness, *Hearing, Cats, Stimulation, Sensitivity, Histology, Ear, Thresholds (Physiology), Audiometry, Calibration, Behavior, Low frequency, Stochastic processes, Wounds and injuries, Training, Reliability, Test methods, Photographs, Tables, Production, Noise.

Aural effects of exposure to intense noise were investigated by measurements of the auditory sensitivity of cats, as determined by their behavior, before and after exposures and by histological examination of their cochleas. Exposures to 115 db for 1/8 hour or 105 db for 1/4 hour result in temporary threshold shift (TTS) with the same general features and course of recovery as for man. However, 1/4-hour exposures require 18 db less sound to produce the same magnitude of shift in the cat. Noise of 115 db for 1/4, 1/2, 2, or 8 hours without interruption produced permanent threshold shift (PTS) in which magnitude depended on the duration of the exposure, the test-tone frequency, and the susceptibility of the individual cat. When the 2-hour exposure was divided into 16 doses of 1/8 hour each and four different inter-exposure intervals of 0, 1, 6, and 24 hours were used, PTS declined as inter-exposure interval increased. The pattern of injury ratings along the basilar membrane is highly similar to the pattern of the behavioral audiograms, if both are on anatomical-frequency scale. (Author)

AD-404 767 Div. 16
(TISTM/PCR) OTS price $6.60

Stanford U. School of Medicine, Calif.
A STUDY OF ''IMMEDIATE'' SENSITIZATION BY ADSORPTION OF ANTIGENS AND ANTIBODIES IN VITRO
Annual progress rept.,
by George A. Feigen. 1 May 63, 1v.
Contract Nonr225 46
Unclassified report

Descriptors: *Antigen-antibody reactions, *Allergy, *Gamma globulin, *Toxins and antitoxins, Neuromuscular transmission, Antigens and antibodies, Velocity, Bovines, Heart, Laboratory animals, Rabbits, Fluorescence, Electrophoresis, Histamine, Absorption (Biological), Skin, Inhibition, Mice, Nerves, Temperature, Dosage, Immune serums, Toxicity, Absorption, Hemolysis, Clostridium tetane.

Contents:
Anaphylactic and hemolytic cross-reactions of anti-bovine gamma-globulin
Studies on the perpheral neuromuscular action of tetanus toxin
Effect of antibody concentration on the velocity of sensitization
Studies of in vitro sensitization with thermally altered antibodies
Studies on sea urchin toxin

AD-404 791 Div. 16
(TISTM/PCR) OTS price $1.10

Army Biological Labs., Frederick, Md.
FIBRINOLYTIC PROPERTIES OF THE TULAREMIA

PATHOGEN,
tr. by Ye. I. Aleshina and T. I. Puchkova.
Feb 63, 5p.
ABL T744
Unclassified report

trans. from Rostovskiy Gosudarstvennyy meditsinskiy institut, no. 6, pp. 96-102, 1947.

Descriptors: *Pasteurella, *Fibrin, Man, Laboratory animals, Mice, Rabbits.

When the tularemia pathogen is cultured on a liquid yolk medium it secretes a lytic agent which dissolves plasma fibrin of man and laboratory animals. Fibrinolysins of the tularemia pathogen have a specific action: they have a lytic effect on the fibrin of the same species of animal from which they have been recovered. There is a specific relationship between the virulence of the tularemia pathogen and its fibrinolytic activity. Highly virulent strains are capable of secreting a lytic agent which dissolves fibrin. Weakened and attenuated strains lose their capacity to produce fibrinolysins along with their loss of virulence. The lytic agent secreted by the tularemia pathogen only acts on the fibrin of a susceptible animal, producing lysis of a clot and not touching the fibrin in the plasma of a nonsusceptible animal. (Author)

AD-404 792 Div. 16
(TISTM/PCR) OTS price $1.10

Army Biological Labs., Frederick, Md.
A CHANGE OF THE PROPERTIES OF THE Q-FEVER CAUSATIVE AGENT,
tr. by Charles T. Ostertag, Jr. Feb 63, 2p.
ABL T747
Unclassified report

Trans. from Jnl. of Microbiology, Epidemiology and Immunobiology No. 1, p. 152, 1963.

Descriptors: *Coxiella, Rickettsia, Chickens, Embryos, Complement, Laboratory animals, Sex glands, Radiation effects, Ionization, Radioactive isotopes, Swine, Phosphorus, Mutations.

AD-404 808 Div. 16
(TISTM/AAR) OTS price $1.60

Naval Radiological Defense Lab., San Francisco, Calif.
DIFFERENTIAL RADIOSENSITIVITY OF FIRST- AND SECOND-SET RESPONSES TO ALLOGENEIC AND XENOGENEIC SKIN GRAFTS IN SUBLETHALLY IRRADIATED MICE,
by M. L. Tyan and L. J. Cole. 15 Apr 63, 14p.
NRDL TR636
Unclassified report

Descriptors: *Skin, Immunology, Mice, Rats, X-rays, Immune serum, Radiation tolerance, Transplantation.

Data are presented demonstrating the differential radiosensitivity of the first and second-set responses of sublethally irradiated (670 rad) mice previously sensitized with allogeneic (H-2 difference), xenogeneic (rat) or both allogeneic and xenogeneic skin grafts. The second-set response is more radioresistant than is the first-set response. The second-set response to a xenogeneic graft remains intact during and following recovery from the effects of sublethal irradiation. While intact for a brief period following irradiation, the second-set response to an allogeneic skin graft was abrogated by sublethal irradiation (670 rad). Concurrent presensitization with allogeneic and xenogeneic skin grafts prevented the abrogation of the second-set response to the allogeneic graft by sublethal irradiation. The first-set response to an allogeneic graft recovered from the effects of sublethal irradiation prior to the recovery of the first-set response to a xenogeneic graft. (Author)

AD-404 809 Div. 16, 28
(TISTM/CCH) OTS price $1.60

Gaustad Mental Hospital, Oslo (Norway).
BRAIN AND BEHAVIOR: INTRACEREBRAL ELECTROGRAPHIC STUDIES IN THE HUMAN BRAIN.
Final technical rept. no. 4, 1 Dec 61-30 Nov 62,
by C. W. Sem-Jacobsen. 30 Nov 62, 14p.
Contract DA91 591EUC2028
Unclassified report

Descriptors: *Brain, *Behavior, *Nervous system, Stimulation, Electrodes, Light, Speech, Punch cards, Neurology, Surgery, Pattern recognition, Data processing systems, Electroencephalography, Electric potential, Attention, Physiology.

The examination and treatment of four patients started in the previous period and additional six patients, two female and four male, were studied and attended to, using intracerebral depth-electrography. The various types of responses obtained to electrical stimulation are classified. They have been grouped according to the various neurological systems being responsible for the responses obtained. The evaluation of the patients' level of consciousness and/or degree of alertness has been rather difficult. After having tried out a number of tracking tests we have developed a technique by which the patient is following with a flashlight a slow moving photocell in the ceiling of the examining-room.(Author)

AD-404 874 Div. 16, 20
(TISTP/MFA) OTS price $3.60

Microwave Lab., Stanford U., Calif.
PARTIAL CELL IRRADIATION AND SOFT X-RAY MICRODIFFRACTION,
by V. W. Burns and H. H. Pattee. Apr 63, 29p.
BL85
Contract Nonr22551, Proj. NR304 471
Unclassified report

Descriptors: *Biophysics, Microstructure, Cells (Biology), Algae, Radiation effects, Radiation damage, Electron beams, Nuclei (Biology), Radiological (Dosage), Molecular structure, X-ray diffraction analysis.

AD-404 875 Div. 16
(TISTM/CCH) OTS price $2.60

London U. (Gt. Brit.).
PHOSPHOPROTEIN METABOLISM IN CEREBRAL FUNCTIONING.
1963, 25p. ST1
Contract DA91 591EUC1944
Unclassified report

Descriptors: *Brain, *Phosphoproteins, Enzymes, Electric potential, Stimulation, Sensitivity, Identification, Metabolism.

Contents:
Subcellular distribution of cerebral phosphoproteins, including location of a phosphoprotein

sensitive to electrical stimulation
Studies of a cerebral protein phosphokinase
Attempts to isolate proteins enriched in phosphoproteins from brain

AD-404 881 Div. 16
(TISTM/AAR) OTS price $1.60

Cornell Aeronautical Lab. Inc., Buffalo, N. Y.
INVESTIGATION OF THE FUNCTION OF THE CORPUS STRIATUM.
Final technical rept., 1 Jan-31 Dec 62,
by A. Mosfeldt Laursen. 31 Dec 62, 11p.
Contract DA91 591EUC2119
Unclassified report

Descriptors: *Brain, Tissue, Pigeons, Cats, Psychology, Biochemistry, Histology, Sensory mechanisms, Behavior, Learning, Nervous system, Physiology.

Investigations of the function of the corpus striatum, the conditioned avoidance behavior of cats with lesions in the globus pallidus, the learning in cats with lesions in the globus pallidus and the ability of pigeons to discriminate between other pigeons are presented. (Author)

AD-404 891 Div. 16
(TISTM/CCH) OTS price $1.60

Wander, A. Forschungsinstitut, GMBH Freiburg, Germany.
RESEARCH ON THE PRODUCTION AND IMMUNOLOGICAL EXAMINATION OF ARTIFICIAL ANTIGENS CONTAINING KNOWN SUGARS (OR OLIGO-SACCHARIDES) AS THE DETERMINANT GROUPS, IN RELATION TO THE IMMUNOCHEMICAL ANALYSIS OF ENTEROBACTERIAL O-ANTIGENS (ENDOTOXINS).
Final technical rept., 1 Dec 61-30 Nov 62,
by Otto Westphal. 30 Nov 62, 15p.
Contract DA91 591EUC2089
Unclassified report

Descriptors: *Antigens and antibodies, *Carbohydrates, *Eubacteriales, Immunology, Production, Immunity, Toxins and Antitoxins, Salmonella, Escherichia, Toxicity, Inhibition.

Enterobacterial O-antigens are complex toxic lipopolysaccharides on the surface of the bacterial cell wall. Their specificity is given by oligosaccharidic side chains of the highly branched polysaccharide components. By serologic inhibition techniques the determinant endgroups of various O-antigen factors were identified. Three and six tenths-dideoxy-hexoses frequently play a role as endgroups of important determinants in O-antigens of highly pathogenic strains, such as Salmonella paratyphi, Salmonella typhi, Escherichia coli 111, and many others. The artificial antigens were nontoxic, in contrast to the bacterial O-antigens, which are part of the so-called endotoxic complex. (Author)

AD-404 914 Div. 16
(TISTM/LMH) OTS price $1.60

Birmingham U. (Gt. Brit.).
DYNAMIC RESPONSE OF SINGLE NEURONAL UNITS TO FREQUENCY-MODULATED AUDITORY STIMULI IN THE UNANAESTHETIZED ANIMAL.
Annual technical rept. no. 1, 1 Jan-31 Dec 62.
31 Dec 62, 16p.
Contract DA91 591EUC2092
Unclassified report

Descriptors: *Auditory nerve, *Acoustics, Hearing, Animals, Electrodes, Sound, Cats, Stimulation, Audiometry.

The study of the dynamic, as opposed to the steady state, properties of the auditory pathway To this end, and specifically, the response of single units in the auditory cortex of the unanaesthetised unrestrained cat have been recorded under various types of acoustic stimulation. A generator was designed which would provide audiofrequency stimuli capable of being modulated in respect of both frequency and amplitude in any desired manner. A major problem was to obtain adequate frequency modulation free from any significant accompanying amplitude modulation. Records were made by means of micro-electrodes operated by a micro-manipulator attached to the cat's skull. The cat was placed in a spacious cage situated in the anechoic test-room. The stimuli and responses were recorded on magnetic tape and subsequently transferred to film. Records were obtained from 91 units in various parts of the auditory cortex. (Author)

AD-405 017 Div. 16, 3
(TISTM/CCH) OTS price $1.10

Army Biological Labs., Frederick, Md.
A COMPARATIVE STUDY OF THE INTRANASAL AND AEROSOL METHODS OF VACCINATION AGAINST INFLUENZA,
trans. by Charles T. Ostertag Jr. Apr 63, 6p.
ABL T767 Unclassified report

Trans. from J. Microb., Epidemiol. and Immunob., pp. 63-67, 1962 (Copies also available from DDC).

Descriptors: *Influenza virus, *Immunity, Aerosols, Respiration, Nose, Immunology, Vaccines, Test methods.

The reactogenicity of influenza vaccines during the aerosol method of immunization was lower than during the intranasal method. Along with this there were no temperature reactions over 37.5 noted. Other symptoms of vaccinal reaction (head cold, headache, sneezing and others) were observed less seldom during the aerosol method and were not so sharply expressed. The egg tissue and egg-tissue combined type A2 vaccine provided the best indices of adaptability and immunological effectiveness. Comparative data testifies to the future prospects and convenience of the aerosol method for the immunization of large masses of the population with live influenza vaccine, however for a conclusive evaluation of it, further investigations are required. (Author)

AD-405 021 Div. 16
(TISTB/PCR) OTS price $1.10

Joint Publications Research Service, Washington, D. C.
EXPERIMENTAL ANTHRAX INFECTION IN IRRADIATED ANIMALS,
by A. P. Krasil'nikov and N. A. Izraitel'.
3 Apr 63, 8p. R3049D
ABL T769 Unclassified report

Trans. from Meditsynskaya Radiologiya (Medical Radiology), Vol 4, No 6, 1959, pp. 56-60.

Descriptors: *Bacillus anthracis, *Radiation effects, X-rays, Diseases, Mice.

A single overall irradiation of white mice with x-rays in sublethal doses (342 r) lowers the resistance of the animals to anthrax infection. This reduction is already evident one day following irradiation, is clearly manifest after 3

days, and reaches a maximum on the 7th day. Resistance returns fully by the 12th-21st day after irradiation. The lowering of the resistance of the irradiated organism to anthrax infection is even more clearly manifest in experiments using a large radiation dose (550 r). A lowering of the resistance of white mice subjected to ionizing radiation occurs with subcutaneous and intraventral infection; with the intranasal and peroral methods of infection, no significant difference was observed in the reactions of the irradiated and control specimens. Experimental anthrax infection during the course of development of radiation sickness ensues from a substantially lower dose of the infecting agent (a factor of hundreds of thousands), develops 1-1 1/2 days faster, develops with the semination of a large number of organs and the accumulation in them of enormous numbers of microbes (in comparison with the control animals), with a death rate somewhat higher than that of the control group. (Author)

AD-405 054 Div. 16
(TISTM/CCH) OTS price $1.60

Office of the Director of Defense Research and Engineering, Washington, D. C.
MILITARY RESEARCH ON JET FUEL CONTAMINATION.
by Donald B. Brooks. 1963, 15p. FL225 23
Unclassified report

Presented at a Session on Fuels during the 28th Midyear Meeting of the American Petroleum Institute Division of Refining, in the Benjamin Franklin Hotel, Philadelphia, Pennsylvania, 13 May 1963.

Descriptors: *Fuel contamination, Aviation fuels, Jet engine fuels, Fuel tanks, Aviation accidents, Storage, Corrosion, Inhibition, Growth, Bacteria, Fungi, Coatings, Pipes, Decontamination, Storage tanks, Fuels, Microorganisms.

Serious aircraft troubles, including engine flameouts, fuel gage malfunctions, integral tank corrosion, and other fuel system difficulties have been traced to contaminants in the fuel. The chief offenders, singly or in combination, were found to be water, dirt (especially iron rust), surfactants, and microorganisms. Improper operation and maintenance of fuel handling equipment was found to be the causative factor in each case of serious fuel contamination thus far investigated. The consensus of informed opinion is that the troubles encountered in field handling of fuels can be averted by good housekeeping throughout the fuel handling system. (Author)

AD-405 057 Div. 16
(TISTM/CCH) OTS price $1.50

Duke U., Durham, N. C.
CARDIOPULMONARY RESPONSES TO HYPOTHERMIA AND CERTAIN OTHER ENVIRONMENTAL STRESSES.
Final rept., Sep 60-Oct 62,
by F. G. Hall and J. V. Salzano. Mar 63, 49p.
Contract AF33 616 6803, Proj. 7163, Task 716301
AMRL TDR63 19 Unclassified report

Report on Physiology Research.

Descriptors: *Respiration, Epinephrine, Hypoxia, Stress (Physiology), Heart, Lungs, Closed-cycle ecological system, Hypothermia.

Respiratory regulation was studied at normal and sub-normal body temperatures. Hypoxia and body temperature were found to operate reciprocally in determining utilization of oxygen in a closed environment. Respiratory and circulatory responses to imposed tracheal obstruction were studied in normothermic and hypothermic anaesthetized animals. These responses were found to be related to the degree of hypoxia which developed rather than to body temperature, per se. Changes in anatomical and physiological dead space were also measured during reduction of body temperature. There were only small changes in respiratory dead space. No significant impairment of gas transport occurred at body temperatures as low as 28 C. Reflex activity was also studied in normothermic and hypothermic animals. Hypothermic animals retain reflex activity but the magnitude of the responses is less than at normal body temperature. The augmented response to nor-epine-phrine was greater than that for epinephrine during reduction in body temperature to 28 C. Vagal reflexes also operate at body temperatures as low as 28 C. It was found that animals respond to carbon dioxide stress essentially in the same manner in the hypothermic as in the normothermic state but at a lower order of magnitude. (Author)

AD-405 059 Div. 16
(TISTM/LMH) OTS price $14.50

Lockheed Aircraft Corp., Sunnyvale, Calif.
THE DETAILED COMPOSITION OF FECES, SWEAT, AND URINE: AN ANNOTATED BIBLIOGRAPHY,
comp. by Charles M. Pierce. Mar 62, 210p. SB62 56; 8 55 62 2
Unclassified report

Descriptors: *Bibliographies, *Metabolism, Perspiration, Urine, Closed-cycle ecological systems, Ion exchange, Biochemistry, Wastes.

The increased importance of closed-cycle life support systems has produced a need for accumulating information on by-products of human metabolism. This publication consists of 598 references covering the composition of feces, sweat, and urine. Topics which are discussed include methods of analysis; the constancy at which the formed or waste products are created; and the relative influence exerted thereon by diet, climate, body activity, and stress. Most of the references were published between January 1957 and June 1962. A subject index is included. (Author)

AD-405 099 Div. 16, 4
(TISTM/EJH) OTS price $1.10

Army Biological Labs., Frederick, Md.
ANTIBACTERIAL EFFECT OF SOME N-SUBSTITUTED PYRIDINE DERIVATIVES,
by L. R. Kolomoytsev, N. F. Kazarynova, N. I. Heonya, and A. K. Sheynkman. 22 Mar 63, 8p.
ABL T755; JPRS R 3048D
Unclassified report

Trans. from Mikrobiol Zh (Kiev), 24:3:23-8, 1962.

Descriptors: *Organic compounds, *Germicides, *Bacteria, Fungicides, Nitrogen compounds, Complex compounds, Toxicity, Chemotherapeutic agents, Synthesis (Chemistry), Pharmacology.

The antimicrobic action of 18 pyradine derivatives was studied on 14 species of microorganisms. The test preparations were synthesized by the authors from components of pyridine bases of coal tar, several preparations being synthesized for the first time by an original procedure. Seven preparations proved fairly active when

tested in vitro. The highest activity was displayed by derivatives of 4-(n-dimethyl)-aminophenyl pyridine in respect to pathogenetic intestinal bacilli, dysentery bacilli, anthracoid bacilli and staphylococci. (Author)

AD-405 160 Div. 16
(TISTM/CCH) OTS price $1.10

Texas U. Medical Branch, Galveston.
NEUROANATOMY AND EMBRYOLOGY OF MARINE MAMMALS.
Final rept.,
by John G. Sinclair. 1963, 2p.
Contract Nonr335500, Proj. NR104 540
Unclassified report

Descriptors: *Aquatic animals, Cetacae, Embryos, Anatomy, Marine biology, Ecology.

AD-405 164 Div. 16
(TISTM/CCH) OTS price $1.10

Western Reserve U. School of Medicine, Cleveland, Ohio.
METABOLISM OF PROTEIN, AMINO ACIDS AND AMMONIA.
Progress rept., 1 May 62-30 Apr 63,
by George J. Gabuzda. May 63, 7p.
Contract DA49 007md749
Unclassified report

Descriptors: *Metabolism, *Proteins, Ammonium compounds, Kidneys, Amino acids, Biochemistry, Pathology, Heart, Blood, Urine, Rats, Man.

The relation of potassium deficiency to metabolism of ammonia and amino acids is the subject of the following current research. A dog preparation involving induction of potassium deficiency by dialysis is now being used to extend our clinical studies on the relation of potassium and ammonium metabolism in kidney. The relation of potassium deficiency to alterations in amino acid composition of tissues is being studied in groups of rats. Significant increases of threonine, serine, glycine, alanine, lysine and arginine occur in muscle of electrolyte-depleted animals. The significance and mechanisms of this change in amino acid pattern are being investigated. A study on the effects of urea and ammonium chloride infusions on gastric ammonium concentration and on secretory responses to histalog indicate that blood ammonium is a significant source of gastric ammonium, possibly more so than blood urea. Results were similar in neomycin-treated and in non-antibiotic-treated patients. Gastric secretory responses were not altered by elevations of blood or gastric juice urea or ammonium levels, or by pre-treatment with neomycin. Ammonium had no evident neutralizing action on normal human gastric juice. (Author)

AD-405 259 Div. 16
(TISTM/PCR) OTS price $1.60

Uppsala U. (Sweden).
ELECTRONIC DELOCALIZATION AND BIOCHEMICAL EVOLUTION,
by Bernard Pullman and Alberte Pullman.
15 Nov 62, 16p. TN86
Contract AF61 052 351
ARL 63 94
Unclassified report

Presented at the Symposium of the 4th International Summer Institute in Quantum Chemistry and Solid State Physics, 27 Aug-1 Sep 62, held at Rattvik, Dalarna.

Descriptors: *Biochemistry, *Molecular properties, Molecules, Proteins (Conjugated), Nuclei acids, Organic phosphorus compounds, Chemical bonds, Organic pigments, Enzymes, Electron transitions, Carbohydrates, Fats, Steroids, Stability, Synthesis (Chemistry), Decomposition, Semiconductors, Coenzymes, Heterocyclic compounds, Mutations, Electrical properties; Resonance.

Most of the essential biomolecules which are related to or perform fundamental functions of living matter are constituted of completely or partially conjugated systems. The functional advances of such compounds in living matter are discussed.

AD-405 451 Div. 16
(TISTM/WA) OTS price $1.60

Army Biological Labs., Frederick, Md.
LABORATORY OUTBREAK OF HEMORRHAGIC FEVER WITH A RENAL SYNDROME,
by S. M. Kulagin, N. I. Fedorova, and E. S. Ketiladze, tr. by Charles T. Ostertag, Jr.
Feb 63, 11p.
ABL T737 Unclassified report

Trans. from Jnl. of Microbiology, Epidemiology and Immunology, 33:10, pp. 121-126, 1962.

Descriptors: *Communicable disease, *Viruses, Scientific personnel, Epidemiology, Diagnosis, Biological laboratories, Rodents, Disease vectors, Urinary system, Blood counts, Etiology.

Facts were obtained about the mechanism of transmitting hemorrhagic fever with a renal syndrome. A complete understanding has been introduced on the question of the possibility of air-borne infection. It has been established that people are highly susceptible to the virus of hemorrhagic fever with a renal syndrome, as evidenced by the illness of 89.6% of the personnel working constantly in the contaminated premises, and 42% of the personnel who visited the premises 1-3 times. In 32 cases it was possible to establish accurately the duration of the incubation period, which consisted on the average of 20.4 days with a variation of 14-32 days. It confirms the idea about immunity to the disease in those who previously have had it: 5 workers of those working constantly in the infected area had this disease previously (1-3 years ago) and didn't become ill during the present outbreak. (Author)

AD-405 573 Div. 16
(TISTM/CCH) OTS price $1.10

Pasadena Foundation for Medical Research, Calif.
STUDIES ON BODILY DEFENSE MECHANISMS WITH THE USE OF CELL CULTURES.
Final rept., 1 Oct 60-30 Sep 61,
by C. M. Pomerat. 30 Sep 61, 4p.
Contract Nonr3306 00, Proj. NR103 510
Unclassified report

Descriptors: *Immunology, *Cells (Biology), Tissue culture, Blood serum, Viruses, Air, Contamination, Radiological contamination, Hormones, Pituitary gland, Pathology.

AD-405 599 Div. 16
(TISTM/WA) OTS price $1.10

Trinity Coll., Dublin (Eire).
THE EFFECT OF ENVIRONMENTAL TEMPERATURES ON THE ACTIVITIES OF CERTAIN ENZYMES IN MAMMALIAN SKIN.
Annual technical status rept., 1 Apr 62-1 Apr 63,
by J. N. R. Grainger. 1 Apr 63, 7p.
Contract DA91 591EUC2189
Unclassified report

Descriptors: *Enzymes, *Skin, *Rabbits, Ears, Temperature, Oxygen consumption, Environmental tests.

A method was described for maintaining one ear of a rabbit at about 30 C and the opposite ear at about 12 C. Rabbits kept at 6 C air temperature had ear skin temperatures ranging from an average of 16.2 C at the ear base to 12.19 C at the ear tip. There is a small but significant (P = 0.05) difference between the rates of oxygen consumption of minced ear skin, when measured at 30 C, from cold and warm adapted rabbits. The respective means were 1.92 and 1.64 ul./mg N/ hour. The activity of succinic dehydrogenase when measured under standard conditions is very much higher in skin from cold-adapted rabbits ears as compared with warm adapted ear skin. This very significant difference becomes established within the short time of two days at 6 C. (Author)

AD-405 783 Div. 16
(TISTM/LMH) OTS price $2.60

Navy Experimental Diving Unit, Naval Weapons Plant, Washington, D. C.
CONSTITUTIONAL FACTORS IN DECOMPRESSION SICKNESS.
by D. A. Wise. 26 Apr 63, 18p.
Proj. F011 06 01, Task 3361
NEDU NWP RR2 63 Unclassified report

Descriptors: *Diving, *Naval personnel, Decompression sickness, Aging (Physiology), Body, Body weight, Selection, Standards.

To enable selection of bends-resistant men for diving duty, the feasibility of employing constitutional factors as selection criteria was investigated. Feasibility was determined by ascertaining if there was a relationship between constitutional factors (age, height, weight, and body build) and the incidence of decompression sickness. A second problem was to determine if the depth of a dive and body type interact to influence the probability of contracting bends. None of the obtained mean differences between the divers incurring bends and those who did not were of sufficient magnitude to distinguish between the groups. Therefore, no selection criteria could be established. (Author)

AD-405 819 Div. 16, 30
(TISTM/AAR) OTS price $2.60

American Electronic Labs., Inc., Colmar, Pa.
GENERAL BIOPHYSICAL INVESTIGATION AND INSTRUMENTATION.
Final rept.,
by Alvin Singer and Charles Reinhardt. May 63, 24p.
Contract Nonr291200
Unclassified report

Report on Intracardiac and Intravascular Blood Pressure Measurement Utilizing a Transducer Effective at the Focus of Measurement and Intracardiac Blood Pressure Transducer.

Descriptors: *Blood pressure, *Instrumentation, Blood, Heparin, Anticoagulant, Coagulation, Blood coagulation, Cannulation, Measurement, Design.

A new and unique cardiac catheterization instrumentation system was designed and evaluated both physically and physiologically. The system has been shown to function in a fashion superior to present available instrumentation since the new system possesses: higher frequency response, greater sensitivity, avoids blood clotting problems, avoids motion artifacts. (Author)

AD-405 883 Div. 16
(TISTM/AAR) OTS price $1.10

Johns Hopkins U., School of Medicine, Baltimore, Md.
EXPERIMENTAL STUDY OF ACUTE AND CHRONIC INJURY TO RENAL TUBULES.
Annual progress rept. 1 Dec 62-30 June 63,
by Ivan L. Bennett, Jr. 30 June 63, 4p.
Contract DA49 193md2379
Unclassified report

Descriptors: *Kidneys, Rats, Morphology, Electron microscopy, Tissues, Wounds and injuries, Necrosis.

A study of the normal ultrastructure of the rat kidney was undertaken as a basis for a study of the serial morphologic changes in acute tubular necrosis. By electron microscopy, a close structural relationship between endoplasmic reticulum and cytosomes and between cytosomes and the Golgi region was established. The tytosomes involved are acid-phosphatase containing and may be regarded, preliminarily, as lysosomes. The technique of nephron-dissection has been perfected in the laboratory and is being applied to normal kidney tissues. (Author)

17. METALLURGY

AD-404 727 Div. 17, 26
(TISTM/AMS) OTS price $2.60

Westinghouse Electric Corp., Blairsville, Pa.
PROCESSING AND EVALUATION OF PRE-PRODUCTION QUANTITIES OF COLUMBIUM ALLOY SHEET.
Interim rept. no. 1, 24 Jan-23 Apr 63,
by R. A. Nadler. 3 May 63, 18p.
Contract N600 19 59546
Unclassified report

Descriptors: *Niobium alloys, Molybdenum alloys, Vanadium alloys, Zirconium alloys, Extrusion, Forging, Hot working, Manufacturing methods, Low pressure research, Experimental data, Microstructures, Sheets, Mechanical working.

A 250 lb, 6-in. diam, B-66 ingot (Cb-5Mo-5V-1Zr) was processed to 0.165-in. thick sheet by means of extrusion, forging, and rolling. Data for these and intermediate operations are given and plans are outlined for future work on the B-66 and FS-85 (Cb-27Ta-10W-1Zr) alloys. (Author)

AD-404 731 Div. 17
(TISTM/AMS) OTS price $1.25

Metals and Ceramics Lab., Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
THE INVESTIGATION OF THE EFFECTS OF LOADING RATE AND STRESS CONCENTRATION FACTORS ON THE NOTCH PROPERTIES OF THREE SHEET ALLOYS AT SUBZERO TEMPERATURES.
Final rept., July 60-Feb 62,
by A. W. Brisbane. Mar 63, 34p.
Proj. 7351, Task 735106
ASD TDR62 930 Unclassified report

Report on Metallic Materials.

Descriptors: *Low temperature research, *Cryogenics, *Alloys, Stainless steel, Steel, Nickel alloys, Chromium alloys, Molybdenum alloys, Titanium alloys, Aluminum alloys,

Tensile properties, Loading (Mechanics), Stresses, Transition temperature, Martensite, Hardness, Colbalt alloys, Iron alloys, Tool steel.

The effect of theoretical stress concentration factors, and loading rates at 26, -78, and -196 C are presented for 301XH stainless steel, Rene 41, and Vasco Jet-1000 sheet materials. The unnotched specimens, tested at room temperature, were not appreciably affected by loading rate; however, some effects were observed for the specimens tested at sub-zero temperatures. The loading rate had some effect on the notched tensile specimens at all test temperatures. The temperature effect was more pronounced on the notched tensile specimen at the fastest loading rate. In most instances the tensile strength increased as the temperature decreased. The percent elongation for the three materials was highest at the -78 C test temperature. Type H-11 material became very brittle at -196 C and shattered upon fracture. The notch to unnotch strength ratio decreased as the stress concentration factor increased.

AD-404 738 Div. 17, 26
(TISTM/BRW) OTS price $4.60

Universal-Cyclops Steel Corp., Bridgeville, Pa.
TUNGSTEN SHEET ROLLING PROGRAM.
Interim rept. no. 7, 1 Feb-30 Apr 63,
by W. J. Schoenfeld. May 63, 37p.
Contract AF33 600 41917
ASD ASC TR7 827 V7 Unclassified report

Descriptors: *Tungsten, *Sheets, Rolling mills, Heat treatment, Tensile properties, Tolerances (Mechanics), Thickness, Microstructures, High temperature research, Material forming, Manufacturing methods.

Two sheets of 0.060-in., two 0.040-in. and five 0.020-in. gage sheets were rolled to a nominal 36 in. wide x 36 in. long. Cracking occurred on several pieces during initial rolling and this was attributed to excessive reduction per pass. On subsequent rolling this problem was minimized. Cracking which occurred on the thinner gauges was attributed to handling and this problem has not been resolved. The bend properties of the 0.060-in. material were consistent with those previously established. Tensile properties below 200 F. have not been established due to premature failure of the specimen; however, the properties above this temperature have been established and are within the desired variation limits. Gauge and flatness were also within the desired limits on the 0.060 in. material. (Author)

AD-404 789 Div. 17
(TISTM/AMS) OTS price $6.60

Brown U., Providence, R. I.
THE BEHAVIOR OF METALS AT ELEVATED TEMPERATURES UNDER IMPACT WITH A BOUNCING BALL,
by C-H. Mok and J. Duffy. Apr 63, 1v. TR33
Contract Nonr56220, Proj. NR064 424
Unclassified report

Descriptors: *Metals, Hardness, Test methods, Velocity, Impact shock, High temperature research, Experimental data, Mathematical analysis, Equations, Theory, Deformation, Plasticity, Lead, Aluminum alloys, Elasticity, Penetration, Mechanics.

This report describes an investigation into the behavior of metals under impact at elevated temperatures. In a series of tests, a hard spherical ball strikes the flat surface of a massive specimen, which in one instance was a commercially pure lead and in another an aluminum alloy. Tests were made at a number of temperatures at each of which the velocity of impact and the velocity of rebound were measured, as well as the size of the permanent indentation in the specimen surface, and the time of contact between ball and specimen. Through dimensional analysis, relations were derived which predict quite accurately the time of contact and the diameter of the permanent indentation for a given material. Present results indicate a possibility that impact tests can be used to measure the dynamic yield stress, but a more complete investigation of this question is reserved for a later report. (Author)

AD-404 906 Div. 17, 4, 26
(TISTM/BRW) OTS price $4.60

General Telephone and Electronics Labs., Inc., Bayside, N. Y.
EXPERIMENTAL STUDY OF FACTORS CONTROLLING THE EFFECTIVENESS OF HIGH-TEMPERATURE PROTECTIVE COATINGS FOR TUNGSTEN.
Quarterly progress rept. no. 2, 15 Aug-15 Nov 62,
by M. G. Nicholas, C. D. Dickinson, and L. L. Seigle. 15 Dec 62, 1v. TR62 461.7; NP12592
Contract AF33 657 8787
Unclassified report

Descriptors: *Heat resistant metals and alloys, *Coatings, Thorium alloys, Zirconium alloys, Tungsten alloys, Hafnium alloys, Oxygen, Metals, Diffusion, Tin alloys, Aluminum alloys, Oxides, Films, High temperature research, Thorium compounds, Zirconium compounds, Nitrides, Reaction kinetics, X-ray diffraction analysis, Phase studies, Microstructure, Thickness, Surface properties, Oxidation.

Two processes governing the efficacy of high-temperature protective coatings for tungsten, interdiffusion in ternary oxygen-metal-metal systems and breakaway during oxide film growth, are being investigated experimentally to determine the oxidation behavior of binary alloys and the influence of substrate mechanical properties on the growth characteristics of the oxide films. Experiments involving oxidation kinetics and the microstructural and quantitative identification of the layers formed have been conducted on four systems. An analysis of the diffusion processes governing growth in the Zr-Th-O system is presented, and a preliminary discussion of the results obtained in the W-Hf-O, ZrN-ThN-O and Sn-Al-Cr systems is given. (Author)

AD-404 923 Div. 17, 8, 25
(TISTP/MFA) OTS price $2.60

Aerospace Corp., Los Angeles, Calif.
ELECTRONICS RESEARCH PROGRAM. LOW-TEMPERATURE ELECTRONICS.
Semiannual technical note, 1 July-31 Dec 62,
by F. L. Vernon, Jr. 29 Apr 63, 16p. TDR169 3250 13TN1
Contract AF04 695 169
SSD TDR63 98 Unclassified report

Descriptors: *Niobium alloys, *Superconductors, Low temperature research, Filaments, Copper, Electrons, Superconductivity, Tests.

The initial experimental work on the high-field superconducting characteristics has started with an investigation of the effect of grain size on the critical field (H sub c)-critical current (I sub c) relationship. Measurements have been made which show an anomalous behavior of H sub

c versus I sub c for a certain range of grain sizes. Future work will be directed toward obtaining a complete experimental and theoretical description of the relationship between the structural variations and the electrical characteristics. Initial experiments on the properties of superconducting thin filaments have been performed on samples consisting of lead imbedded in a copper matrix. The results have indicated that size-dependent behavior occurs before it would be expected on a theoretical basis. It is possible that the normal copper electrons are severely affecting the superconducting properties of the lead. Additional experiments are being planned to define the phenomenon more completely. (Author)

AD-405 061 Div. 17, 25, 30
(TISTM/PCR) OTS price $1.00

Directorate of Materials and Processes, Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
OBSERVATION OF MAGNETIC DOMAINS BY MEANS OF THE BITTER COLLOID METHOD.
Final rept., Oct 61-June 62,
by Robert J. Patton and Karl J. Strnat. Mar 63, 21p.
Proj. 7371, Task 737103
ASD TDR63 83
Unclassified report

Report on Applied Research in Electrical, Electronic, and Magnetic Materials.

Descriptors: *Powder metals, *Magnetic properties, Magnetic fields, Magnetic materials, Microscopes, Microscopy, Ferromagnetic materials, Ferromagnetism, Colloids, Iron compounds, Oxides, Circuits, Silicon alloys, Steel, Hysteresis, Test methods, Test equipment, Photographs.

Experimental equipment was developed for the light-microscopic observation of ferromagnetic domains by means of the Bitter technique. The design of an electromagnet-microscope stage which can accommodate both bulk samples and thin sheet strips is described. The formula for the preparation of the colloidal iron-oxide solution is given. Photographs of domains on silicon-iron transformer sheet illustrate the quality of the pictures and the resolution which can be obtained with the set-up. (Author)

AD-405 136 Div. 17, 26
(TISTM/AMS) OTS price $6.60

Nuclear Metals, Inc., Concord, Mass.
BERYLLIUM RESEARCH AND DEVELOPMENT PROGRAM.
Quarterly progress rept., 1 July-30 Sep 62,
by S. H. Gelles. 28 Jan 63, 60p. 9525
Contract AF33 616 7065, Tasks 73518 and 735104
Unclassified report

Descriptors: *Beryllium, Particle size, Brittleness, Ductility, Powder metals, Grain structure (Metallurgy), Transition temperature, Test methods, Impurities, Chemical analysis, Extrusions, Oxygen, Iron, Crystal structure, Crystal lattice defects, Films, Powder metallurgy, Microstructures, Single crystals, Controlled atmospheres, Radiography, Hot working, Mechanical properties, Low pressure research, Silicon alloys, Beryllium alloys, Iron alloys, Experimental data, Analysis, Reports.

AD-405 564 Div. 17, 4
(TISTM/EJH) OTS price $2.60

New York U., Coll. of Engineering, N. Y.
LITERATURE SURVEY ON THE PREPARATION OF METALS FROM ORGANOMETALLIC COMPOUNDS,
by Minoru Tsutsui and Donald Lorenz. Mar 63, 16p. SR1
Contract AF19 628 1685, Proj. 4608, Task 460802
AFCRL63 22 Unclassified report

Descriptors: *Metalorganic compounds, *Transition elements, *Rare earth elements, *Bibliography, Rare earth compounds, Complex compounds, Nickel, Iron, Cobalt, Chromium, Decomposition, Reduction (Chemistry), Chemical reactions, Impurities, Hydrogenation, Preparation.

This literature survey covers the reported work on the preparation of metals from organometallic derivatives. The main emphasis has been placed on the transition and rare earth metals with thermal or chemical methods of recovery. A general survey of the organometallic derivatives which have been prepared for these types of metals has been included only to suggest possible avenues of approach in selection of the type which would offer the most desirable properties. (Author)

AD-405 620 Div. 17, 26
(TISTM/AMS) OTS price $1.60

Whirlpool Corp., St. Joseph, Mich.
THERMOELECTRIC JUNCTIONING PROJECT.
Progress rept. no. 2, 1 July-30 Sep 62,
by R. G. Sickert. 31 Oct 62, 16p.
Contract NObs86483, Proj. SR007 12 01, Task 806
Unclassified report

Descriptors: *Soldering, *Thermoelectricity, *Soldering alloys, Ultrasonic radiation, Low pressure research, Soldering fluxes, Hydrochloric acid, Bismuth alloys, Indium alloys, Tin alloys, Antimony alloys, Zinc compounds, Chlorides, Surface properties, Aging (Materials), Experimental data.

The effort expended in the second quarter was mainly concerned with evaluation of solder alloys and their characteristics. The best solder series discovered during this period was a combination of bismuth, tin and antimony. Workable solders of this series were developed with melting points ranging from 400 to 273 F. Because surface cleanliness and preparation technique are extremely important in producing a superior solder joint, studies involving surface examination through electron microscopy were initiated to determine the surface contaminants. The sensitivity of the joint resistance scanner was improved by one order of magnitude to accurately determine resistance to 1 x 10 to the -7th power ohms. (Author)

AD-405 680 Div. 17
(TISTM/AMS) OTS price $1.50

Armour Research Foundation, Chicago, Ill.
RESEARCH ON THE BASIC NATURE OF STRESS CORROSION FOR VARIOUS STRUCTURAL ALLOYS AT ROOM AND ELEVATED TEMPERATURES,
by Frank A. Crossley. Feb 63, 49p. B206 12
Contract AF33 616 7612, Proj. 7351, Task 735106
ASD TR61 713, pt. 2 Unclassified report

Descriptors: *Corrosion, *Aluminum alloys, *Heat-resistant metals & alloys, Magnesium alloys, Zinc alloys, Microstructure, Titanium alloys, Vanadium alloys, Resistance (Electrical), Tensile properties, Grain structure (Metallurgy), Molybdenum alloys, Chromium alloys, Nickel alloys, Stainless steel, Stresses.

Program objectives were: (1) to study the effect

of microstructure on susceptibility to stress-corrosion cracking in the short-transverse direction of 7075-T6 aluminum alloy; and (2) to study the kinetics of stress-corrosion cracking at elevated temperature of candidate materials for structural applications in the trisonic transport in the presence of sea salt. It was hypothesized that the poor resistance to stress corrosion of high-strength, wrought aluminum alloys was due to the layered-type microstructure characteristic of these materials. Short life was associated with the layered-type of grain structure characteristic of commercial material, and long life was associated with irregular or equiaxed grain structures. The experimental results gave good support to the hypothesis. (Author)

AD-405 694 Div. 17
(TISTM/AMS) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
NEW METHOD OF IMPROVING THE MACHINABILITY OF CAST STEEL,
by S. V. Lominskiy. 6 May 63, 7p.
FTD TT63 352
Unclassified report

Trans. from Russian Periodical, Doklady Akademii Nauk BSSR, 6:6, pp. 366-369, 1962.

Descriptors: *Steel, *Machining, *Castings, Sodium compounds, Sulfites, Sulfur, Sulfides, Carbonates, Mechanical properties, Manganese.

The possibility of increasing cast steel machinability by introducing sodium sulfur compounds into the ladle containing melted steel immediately before casting the metal into an ingot is investigated. (Author)

AD-405 751 Div. 17
(TISTM/AMS) OTS price $4.60

Research Chemicals Div., Nuclear Corp. of America, Burbank, Calif.
THE PREPARATION OF HIGH PURITY RARE EARTH METALS BY ZONE REFINING.
Final rept., 1 Jan 62-31 Jan 63,
by C. J. Heinink. 31 Jan 63, 26p.
Contract AF19 604 7491, Proj. 4608, Task 460802
AFCRL 63 36 Unclassified report

Descriptors: *Rare earth elements, *Zone melting, Europium, Samarium, Gadolinium, Impurities, Purification, Ion exchange, Induction heating, Electron beams, Distillation, Analysis, Oxygen, Test methods, Manufacturing methods, Mass spectroscopy, Infrared spectroscopy, Radioactivation analysis, Chromatographic analysis, Separation, Reduction (Chemistry).

Ultra high purity rare earth metals, Samarium, Europium, Gadolinium with total impurities of less than .1 ppm were attempted. Methods of separation, reduction and purification were: ion exchange, dry fluoride preparation, metallothermic reduction, vacuum distillation, zone refining by induction heat and electron beam melting. Gas chromatography was investigated as an analytical tool for determination of oxygen in metals. (Author)

AD-405 821 Div. 17, 25
(TISTM/AMS) OTS price $4.60

General Electric Co., Schenectady, N. Y.
PEST REACTIONS IN INTERMETALLIC COMPOUNDS. I.
GRAIN BOUNDARY HARDENING IN NiGa.
Final rept. Feb 62-Feb 63,
by A. U. Seybolt and J. H. Westbrook. Apr 63, 37p.
Contract AF33 657 7980, Proj. 7350, Task 735001
ASD TDR63 309 P1 Unclassified report

Report on Refractory Inorganic Nonmetallic Materials.

Descriptors: *Intermetallic compounds, *Nickel alloys, *Gallium alloys, High temperature research, Oxygen, Nitrogen, Impurities, Hardness, Controlled atmospheres, Cooling, Quenching (Cooling), Aging (Materials), Heat treatment, Penetration, Microstructure, Crystal lattices, Density, Heat of formation, Heat of reaction, Diffusion, Mathematical analysis, Crystal lattice defects, Oxidation, Brittleness.

The phenomenon of grain boundary hardening has been explored for the CsCl structure intermetallic compound NiGa. NiGa has a homogeneity range of a few percent and it was possible to examine the effect of stoichiometry upon the grain boundary hardening due to preferential oxygen diffusion down grain boundaries. While some grain hardening was noticeable just below 50% Ga, the effect was much less pronounced than at 52% Ga. It was possible to estimate both bulk diffusion and grain boundary diffusion rates for oxygen. The results suggest that hardening is due to lattice distortions which arise from the formation of a Ga-O complex. (Author)

AD-405 857 Div. 17, 26
(TISTM/BRW) OTS price $1.60

Battelle Memorial Inst., Columbus, Ohio.
FURTHER DEVELOPMENT OF DUCTILE TUNGSTEN-BASE SHEET ALLOY.
Quarterly progress rept. no. 1, 8 Feb-8 May 63,
by J. L. Ratliff, D. J. Maykuth, H. R. Ogden, and R. I. Jaffee. 8 May 63, 10p.
Contract N600 19 59738
Unclassified report

Descriptors: *Tungsten, *Tungsten alloys, Sheets, Rhenium alloys, Thorium compounds, Zirconium compounds, Dioxides, Powder metallurgy, Sintering, Powder metals, Aluminum compounds, Potassium compounds, Silicon compounds, Oxides, Microstructure, Rolling mills, Heat treatment, Brittleness, Ductility, Transition temperature, Impurities, Recrystallization, Material forming.

Ternary alloys of W containing 5% Re in combination with ThO2 inert oxide dispersions were prepared to determine the limits of fabricability for oxide contents between 4 and 7 vol-%. Results from this initial work indicated that good workability persists to at least 5 vol-% level of either ThO2 or ZrO2. A group of doped but otherwise unalloyed W powders was prepared to evaluate the effect of alkali silicate additives on the recrystallization behavior of W sheet. (Author)

AD-405 860 Div. 17, 30
(TISTM/AMS) OTS price $1.60

Redstone Scientific Information Center, Redstone Arsenal, Ala.
POLAROGRAPHIC METHOD OF IRON DETERMINATION IN

ORES AND SLAGS IN THE METALLURGIC INDUSTRY,
by Yu. S. Lyalikov, tr. by Ingeborg V. Baker.
1 June 63, 12p.
RSIC15 Unclassified report

Trans. from Zavodskaia Laboratoriia, 7, pp. 395-399, 1938.

Descriptors: *Polarographic analysis, *Ores (Metal sources), *Slags, Test methods, Iron.

AD-405 379 Div. 17, 25
(TISTM/AMS) OTS price $.50

Naval Research Lab., Washington, D. C.
TRANSVERSE MAGNETORESISTANCE OF ALUMINUM,
by J. Babiskin and P. G. Siebenmann. 9 May 63, 6p.
NRL 5949 Unclassified report

Descriptors: *Aluminum, *Cryogenics, Crystals, Single crystals, Electrical properties, Magnetic fields, Magnets, Stresses, Purification, Resistance (Electrical), Magnetic properties.

Because Al shows promise as a conductor suitable for a cryogenic magnet, its transverse magnetoresistance was studied. The measurements were made on six samples of 99.999 percent pure aluminum at 4.2 K in magnetic fields H up to 120,000 gauss, the samples having been annealed, and in two cases cold worked, so as to be in various states of strain. Valid data were obtained from four of the samples, for which the ratios (at H = 0) of room temperature resistivity R(300 K) to the resistivity R at 4.2 K were 1530, 1180, 1075, and 333. Almost all of the resistivity decrease gained at H = 0 by using a less strained metal is preserved at high magnetic fields for a metal whose magnetoresistance exhibits a predominately saturating behavior. The data from the 4 samples were normalized fairly well by Kohler's rule. This indicates that further reductions in the power necessary to operate cryogenic magnets can be profitably achieved by using purer Al. (Author)

AD-405 898 Div. 17
(TISTM/AMS) OTS price $5.60

Aerojet-General Corp., Azusa, Calif.
STRESS-CORROSION CRACKING OF HIGH-STRENGTH ALLOYS.
Quarterly progress rept. no. 9, 1 Jan-31 Mar 63,
by R. B. Setterlund. May 63, 1v. 0414 01 9
Contract DA04 495ord3069
Unclassified report

Descriptors: *Titanium alloys, *Steel, *Corrosion, *Heat resistant metals and alloys, Aluminum alloys, Vanadium alloys, Nickel alloys, Cobalt alloys, Heat treatment, Quenching (Cooling), Aging (Materials), Welding, Cold working, Rocket cases, Tests, Test methods, Controlled atmospheres, Protective treatments, Coatings, Hardness, Tensile properties, Fractography, Fracture (Mechanics), Fatigue (Mechanics), Experimental data, Stresses.

Test results showed that, under all the test conditions of this program, the 6A1-4V titanium alloy is immune to stress-corrosion cracking in the annealed, quenched-and-aged, and as-welded conditions. The 20%-nickel grade of maraging steel was found to be highly susceptible to stress-corrosion cracking in the annealed-and-aged condition. This same alloy, when cold-worked 50 to 75% before aging, was found to be only mildly susceptible to stress-corrosion cracking. The most favorable mechanical properties were attained after 50% cold reduction and subsequent aging. The welded-and-aged alloy was found to be extremely susceptible to stress-corrosion cracking in the weld-heat-affected zone. The 18%-nickel grade of maraging steel was also found to be susceptible to stress-corrosion cracking, which was found to occur more rapidly in the annealed-and-aged material than in the 50% cold-worked-and-aged material. (Author)

18. MILITARY SCIENCES AND OPERATIONS

AD-404 720 Div. 18, 30
(TISTP/WH) OTS price $1.60

System Development Corp., Santa Monica, Calif.
SAGE UNIQUE-TO-SITE ENVIRONMENTAL DATA AND EQUIPMENT ASSIGNMENTS, DULUTH ADS,
by D. M. McDaniel. 22 Mar 63, 18p. TM ADC820 303 00A
Contract AF19 628 164816
Unclassified report

Descriptors: *Air Defense Command.

AD-405 106 Div. 18, 15
(TISTM/PCR) OTS price $1.60

Operations Evaluation Group, Office of Naval Operations.
BAYESIAN SUPPLY POLICIES FOR SERVICE-LIFE PARTS. Interim research memo.,
by T. A. Goldman. 27 Mar 63, 15p. IRM36
Unclassified report

Descriptors: *Logistics, Statistical processes, Armed forces procurement, Army equipment, Air force equipment, Naval equipment, Life expectancy, Mathematical prediction, Theory.

The characteristic feature of service-life parts, from the standpoint of inventory theory in particular and of logistics management in general, is that demands (i.e., parts failures) are not generated by a Poisson process, because failures are not independent of age. The applicable statistical models are those of renewal theory and replacement theory. Where uncertainty exists concerning the parameters of the underlying failure distribution, the techniques of Bayesian decision theory may be advantageously applied. This memorandum examines some of the theoretical and practical implications of applying Bayesian techniques to the logistics of service-life parts. (Author)

AD-405 709 Div. 18, 13
(TISTM/PCR) OTS price $17.00

Panero, Guy B., Engineers, New York.
SHELTER CONFIGURATION FACTORS (ENGINEERING AND COST ANALYSES).
15 Apr 63, 1v.
Contract OCD OS62 108
Unclassified report

Descriptors: *Shelters, Costs, Engineering, Configuration, Analysis, Shielding, Blast, Fires, Chemical warfare agents, Biological warfare agents, Radiological warfare agents, Radioactive fallout, Design, Structural properties, Concrete, Steel, Bedding, Heat transfer, Electrical equipment, Oxygen consumption, Oxygen equipment, Carbon dioxide, Underground structures, Temperature, Humidity, Pictures, Soils, Tables, Civil defense systems.

Shelter shapes and sizes that appear to offer the

best compromise for standardizing new shelter design are described. The study had the following general conditions and criteria: (1) belowground, single-unit structures with a minimum of three feet of earth cover such as might be constructed under parks or playgrounds; this will result in radiation protection factors of 1000 or more; (2) consideration of both fallout and blast shelters; fallout shelters to be designed on a nominal live-load basis and blast shelters to be designed at 35 and 60 psi overpressure; (3) an extended shelter occupancy time and a closure capability of up to 24 hours; (4) protection against the induction of chemical, biological and radiological contaminants; and (5) single-unit capacities of 100, 500 and 1000 persons each with a 5-minute loading capability. (Author)

AD-405 713 Div. 18, 20
(TISTM/DGH) OTS price $11.50

Engineering-Science, Inc., Arcadia, Calif.
THE RECOVERY AND RESTORATION OF METROPOLITAN WATER WORKS FOLLOWING NUCLEAR WAR ATTACK.
May 63, 147p.
Contract OCD OS62 106
Unclassified report

Descriptors: *Water supplies, *Radiological warfare, *Radiological contamination, *National defense, Decontamination, Shelters, Radioactivity, Civil defense systems, Damage, Disasters, Preparation.

The effects of nuclear weapons and radioactive fallout on waterworks facilities and operations; the response to these forces and the countermeasures to provide the capability for recovery have been considered. The effect forces of disaster may have on each of the units of a metropolitan water supply system and the response of the unit to such a condition are studied. Applicable measures of repair and/or decontamination of such units and the effect of an interruption in the supply of water from the source facility, or change in quality rendering it unusable, was considered as well as the effect a decrease in waterworks operating personnel might have on the over-all operation. The scaling of the forces of disaster included both minimum conditions likely to result in a significant effect on the system, and a maximum condition just short of complete destruction of the entire system. Procedures for use of alternate facilities have been considered for the event that portions of a system experience damage to an extent precluding repair under emergency conditions. Operations have been grouped into the following time sequence of events: preparatory phase (advance preparation); tension phase (alert - ''buttoning-up''); attack and shelter phase (personnel protection); survival phase (emergency operations); recovery phase (emergency restoration); and reconstruction phase (system reconstruction). (Author)

19. NAVIGATION

AD-404 826 Div. 19, 30, 12, 8
(TISTP/JEA) OTS price $6.60

Stanford U., Calif.
OPTIMAL BOUNDED CONTROL OF LINEAR SAMPLED-DATA SYSTEMS USING QUADRATIC PERFORMANCE CRITERIA,
by Gary W. Deley. Apr 63, 59p. SUDAER 148
Grant NsG133 61
Unclassified report

Descriptors: *Programming (Computers), *Control systems, Matrix algebra, Linear systems, Computer logic, Sampling, Feedback, Automatic Attitude control systems, Satellites (Artificial), Transformations (Mathematics), Data processing systems.

This investigation studies optimal control of linear sampled-data systems where the control is subject to saturation. The system is described by the state-space method. The control is considered to be optimal when it minimizes a performance index which is defined as a sum over the sampling instants of a quadratic function of the states and controls. Both one- and two-input control are considered. The two-input case requires a third set of recurrence relations for use when one input is saturated and the other is not. More inputs can be handled using the same methods, but the complexity increases rapidly with the number of inputs. A detailed discussion of a simple method for finding the minimum of a positive definite quadratic function in two variables subject to the constraint that the minimum be on or within a rectangle is presented. Four examples showing the optimal control of second-order systems determined by the computing method given in this report are presented and discussed. (Author)

AD-404 828 Div. 19, 31
(TISTP/JEA) OTS price $5.60

Bureau of Naval Weapons, Navy Dept., Washington, D. C.
SEA ALIGNMENT OF INERTIAL PLATFORMS,
by J. R. Moore. June 60, 47p.
NAVWEPS RRSY60 48 Unclassified report

Descriptors: *Stabilized platforms, *Inertial navigation, Stabilization systems, Integrals, Gravity, Acceleration, Drift, Velocity, Resolution, Gyroscopes, Pitch (Motion), Noise, Mathematical models, Mathematical analysis, Corrections, Digital computers, Errors, Misalignment, Shipborne.

For evaluation purposes, a space stabilized platform system has been studied. This platform provides a base of reference for observing all motions to which the system is subjected, and a means for remembering these motions. The motions are then analyzed by a digital computer so that their origin and their effect on the system can be ascertained. Velocity is generated in the computer and monitored against the EM log. Initial heading is estimated from the position of the aircraft relative to the deck and the orientation of the ship, the latter being obtained from the Mark 14 compass. An error analysis applied to the theoretical system shows that a probable orientation alignment accuracy of two milli-radians (RMS) may be achieved under normal conditions of operation at sea. The vertical errors are six seconds of arc in either direction. The factors which make the most severe contribution to the errors are listed below in the order of decreasing importance: ocean currents, gyro drift, noise due to roll and pitch, accelerometer inaccuracy, random velocity errors, sustained velocity errors, ships' heading error, and latitude error. (Author)

AD-405 474 Div. 19, 12
(TISTP/TL) OTS price $4.60

General Precision Inc., Tarrytown, N. Y.
STUDY OF MULTI-FUNCTION SENSORS FOR GUIDANCE

SUBSYSTEMS.
Quarterly technical note no. 3, 1 Jan-31 Mar 63,
by Alan Bloch. May 63, 1v.
Contract AF33 657 9207

Unclassified report

Descriptors: *Space navigation, *Celestial guidance, *Rendezvous guidance, Tracking, Position finding, Target position indicator, Stereoscopic map plotters, Optical equipment, Stellar map matching, Image intensifiers, Detectors, Reliability, Design.

AD-405 722 Div. 19, 6
(TISTP/WH) OTS price $10.10

Sperry Phoenix Co., Ariz.
OPERATIONAL ANALYSIS REPORT OF THE MICROWAVE COMMAND GUIDANCE SYSTEM.
May 62, 1v.
Contract AF33 600 37918

Unclassified report

Descriptors: *Command guidance, *Command and control systems, *Flight control systems, Microwaves, Radar tracking, Drones, Digital systems, Data transmission systems.

The operational capabilities and status of the Microwave Command Guidance (MCG) System with respect to its past experiences and its possible future applications in vehicle radar tracking and control are defined. Accuracy and reliability considerations are included. The technical characteristics of the MCG System and how they are applied to system requirements in the area of missile and drone flight control and recovery are described. Advanced techniques and concepts are described and applied to particular applications such as: service and Q-type drones, Naval missiles and unmanned targets, Army surveillance and reconnaissance, glider and Dyna Soar vehicle recoveries, booster and capsule recoveries, and range instrumentation and tracking concepts as applied to space and orbital vehicles. Advanced data transponder packaging and circuitry information is presented, based on experience gained with the Transponder Set AN/APW-22(XY-1). (Author)

20. NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

AD-404 884 Div. 20
(TISTM/AAR) OTS price $2.60

Naval Radiological Defense Lab., San Francisco, Calif.
A METHOD FOR THE COLLECTION, STORAGE, AND MONITORING ANALYSIS OF NATURAL SEA WATER,
by H. Goya, P. Zigman, M. Lai, and J. Mackin.
27 Feb 63, 31p.
NRDL TR637

Unclassified report

Descriptors: *Seawater, Wastes, Radioactive wastes, Radiological contamination, Detection, Measurement, Analysis, Water, pH, Nitrates, Phosphates, Oxygen, Chlorine, Collecting methods, Storage, Radioactivity.

Natural seawater was required for use in experiments designed to determine the dissolution rate of certain nuclear fuel materials. A literature survey was conducted and a method was devised for the collection, storage and analysis of the water. In brief, the method stipulates: (1) off-shore collection of surface water in polyethylene carboys which are subsequently stored, at a reduced temperature, in a dark location and (2) monitoring biological and chemical composition via microfiltration, chlorinity, oxygen, alkalinity, phosphate and nitrate analyses. (Author)

AD-404 888 Div. 20
(TISTM/AAR) OTS price $4.60

Tracerlab Inc., Waltham, Mass.
DEVELOPMENT OF DOSIMETER CALIBRATION ATTACHMENT FOR CDV-794X.
Final type technical rept.,
by A. M. Filipov. Jan 63, 39p.
Contract OCD OS62 260

Unclassified report

Descriptors: *Dosimeters, Radiation measurement systems, Detection, Calibration.

The requirements of the dosimeter calibrator are presented, and specific solutions to the design are given. The necessary modifications to the CDV-794X calibrator, and a method to prepare existing calibrators for use with this attachment are described. The specifications for the attachment are tabulated and the test specifications and procedures are given. A summary of test data obtained from a series of repeated readings with the dosimeters provided by OCD under the subject contract shows the accuracy attainable in checking a dosimeter for proper operation. (Author)

AD-404 911 Div. 20
(TISTP/MFA) OTS price $1.60

Aerospace Information Div., Washington, D. C.
SOVIET RESEARCH REACTORS VVR-M (LENINGRAD) AND VVR-M (KIYEV) SUMMARY OF DATA.
10 May 63, 14p.
AID P63 60

Unclassified report

Descriptors: *Research reactors, Reactor system components, Reactor materials, Reactor cores, Neutron reactions, Cadmium compounds, Sulfides, Neutron flux, Shielding, Reactor shielding materials, Beryllium, Radioactivity, Reactor reflectors, Heat transfer, Reactor fuel elements, Reactor safety systems, Reactor control, Design.

A description of two Soviet water-moderated-water cooled reactors (VVR-M) is presented, one of which is located in Leningrad and the other in Kiyev. These VVR-M reactors were developed from the prototype VVR-M reactor. Background information, general construction details, features of the control and safety systems, heat transfer characteristics, reactor physics, and the experimental facilities afforded by the reactor are presented. The report is illustrated with cross-section views, photographs, and diagrams of the reactor and auxiliary equipment. The report is based on Soviet open literature available at the Aerospace Information Division and the Library of Congress. Any further information concerning these reactors will be published in the form of supplements to this report, as soon as it becomes available. (Author)

AD-405 041 Div. 20
(TISTP/MFA) OTS price $10.50

RAND Corp., Santa Monica, Calif.
MONTE CARLO CALCULATIONS OF THE TRANSPORT OF 14 MEV NEUTRONS IN THE ATMOSPHERE,
by J. I. Marcum. Apr 63, 124p. RM3531PR
Contract AF49 638 700

Unclassified report

Descriptors: *Neutrons, *Monte Carlo method, Neutron transport theory, Nuclear properties, Air-to-surface, Surface properties, Surface burst, Nuclear explosions, Radiological dosage, Neutron scattering, Programming (Computers), Atmosphere, Transport properties.

The Monte Carlo method for the solution of complicated problems involving nuclear radiation is presented. This method has been used chiefly when solution by other means was prohibitively complicated. The solution to a number of problems involving the transport of 14 Mev neutrons in air is given. It should be useful as a guide for those offices and research organizations that have copies of the RAND Monte Carlo neutron transport code. (Author)

AD-405 122 Div. 20
(TISTM/AAR) OTS price $4.60

Hughes Research Labs., Malibu, Calif.
DESIGN AND FABRICATION OF RADIATION DOSIMETRY INSTRUMENTS FOR TISSUE EQUIVALENT PLASTIC MANIKINS.
Final rept.,
by Kay M. Hoalst. Apr 63, 46p.
Contract AF29 601 4607, Proj. 8803
AFSWC TDR63 19
Unclassified report

Descriptors: *Dosimeters, Tissues, Instrumentation, Ionization chambers, Calibration, Automatic, Design.

An instrumentation system to measure the absorbed dose due to ionizing radiations was designed for use with a tissue-equivalent manikin in space flights. The ionization chambers described are fabricated from tissue-equivalent materials to match those of the manikin and conform in design to the Bragg-Gray principle. Experimental curves show saturation conditions, pressure exrapolations, and directional dependence. Further, the design has minimized directional dependence with average losses ranging from 5 to 20% due to shielding of the first-stage electronics, which have been incorporated directly with the ionization chamber. The electrical signal generated by the radiation absorbed dose rate as recorded by the chambers is then processed electronically and telemetered back to earth. The electronic instrumentation functions continuously over a dose range of 0.01 to 100 rads per hour and has a logarithmic response. The chambers are designed to be placed in the tissue-equivalent manikin at the following sites: femur, abdomen, mediastinum, humeri, and spinal column. Automatic calibration is provided for in both the femur and abdomen electronics. The calibration data were obtained by using the gamma rays emitted by cobalt-60. (Author)

AD-405 134 Div. 20
(TISTP/FR) OTS price $4.60

Radiation Effects Information Center, Columbus, Ohio.
MONTHLY ACCESSION LIST. ABSTRACTS, PART I.
15 Apr 63, 42p.
REIC AL 62 Unclassified report

Descriptors: *Radiation effects, Materials, Bibliographies, Abstracts.

AD-405 159 Div. 20, 6
(TISTP/JEA) OTS price $7.60

Franklin Systems Inc., West Palm Beach, Fla.
INVESTIGATION, CONCEPTUAL DESIGN AND OPERATIONAL USE OF A DIRECTIONAL NUCLEAR RADIATION DETECTOR.
Final rept.
Apr 63, 66p.
Contract AF29 601 5405, Proj. 8171, Task 817102
AFSWC TDR63 28
Unclassified report

Descriptors: *Radiation measurement systems, *Gamma counters, *Gamma-ray absorption coefficients, *Radiation measurement system components, Mobile, Detection, Effectiveness, Costs, Weight, Remote control systems, Digital computers, Half life, Calibration, Decontamination, Dosimeters, Scintillation counters, Climatology, Sources, Collimators, Radiation hazards, Airborne, Gamma rays, Helicopters, Design, Operation, Detectors, Shielding, Background, Electronic equipment, Position finding.

Several ground-based systems are feasible for defining the location, curie strength and energy level of numerous and powerful radioactive, gamma-emitting sources scattered across an area of 1,000 ft. radius. These systems use fixed survey sites, mobile sites, or a combination thereof. The preferred system would use two fixed and one mobile sites. (Mobile sites are desirable but unessential.) Accuracy of source location, radiation hazards to crew personnel, optimum means of source collimation, flexibility to adapt to various problem situations, and adaptability to use of certain 2nd - 3rd generation aids involving airborne facilities and superimposed visual displays were studied and are discussed. (Author)

AD-405 580 Div. 20
(TISTP/TL) OTS price $1.10

Litton Systems Inc., Woodland Hills, Calif.
(No title).
Progress rept. for period ending 31 May 63.
29 May 63, 1p.
Contract AF33 657 10584
Unclassified report

Descriptors: *Nuclear reactors, *Radiation damage, Dosimeters, Radioactivity, Radiation measurement systems, Failure (Mechanics), Test equipment.

AD-405 615 Div. 20, 25, 30, 8
(TISTP/FEM) OTS price $1.10

Kaman Nuclear, Colorado Springs, Colo.
DEVELOPMENT AND FABRICATION OF NON-DESTRUCTIVE SPECIFIC GRAVITY MEASURING EQUIPMENT EMPLOYING RADIATION TECHNIQUE.
Monthly progress rept. 1-31 Mar 63.
Mar 63, 2p. 58 92PR55
Contract DA19 029 5010RD2631, Proj. TA2 8051
Unclassified report

Descriptors: *Vacuum apparatus, *Laboratory equipment, Drive shafts, Hoists, Tests, Magnetic tape, Wear resistance, Data processing systems, Data storage systems, Non-destructive testing, Gravity, Densimeters, Control panels, Power transmission belts, Gravimetric analysis.

AD-405 678 Div. 20, 25, 2, 6
(TISTP/CCH) OTS price $5.60

Columbia Radiation Lab., New York.
RESEARCH INVESTIGATION DIRECTED TOWARD EXTENDING

Division 21 - NUCLEAR PROPULSION
Division 22 - ORDNANCE

THE USEFUL RANGE OF THE ELECTROMAGNETIC SPECTRUM.
Quarterly progress rept. no. 1, 16 Dec 62-15 Mar 63,
by R. Novick. 15 Mar 63, 53p.
Contract DA36 039sc90789, Proj. NR372 101
Task 3A99 20 001 09
Unclassified report

Descriptors: *Atomic energy levels, *Radioactive isotopes, *Ionization potentials, *Solid state physics, *Masers, *Radio astronomy, *Cryogenics, *Magnetrons, Helium, Zinc, Ionization, Sodium, Rubidium, Cadmium, Krypton, Calcium, Strontium, Hyperfine structure, Spectrum analyzers, Ruby, Lithium, Optical analysis, Molecules, Lasers, Planetary atmospheres, Superconductors, Resonance.

Contents:
Atomic Physics
Properties of Radioactive Atoms
Physics of Molecules
Solid State Physics
Optical and Microwave Masers
Radioastronomy
Cryogenics
Magnetrons and Special Devices

AD-405 836 Div. 20, 25
(TISTP/MFA) OTS price $4.40

Naval Radiological Defense Lab., San Francisco, Calif.
ESTIMATED TOTAL CHAIN AND INDEPENDENT FISSION YIELDS FOR SEVERAL NEUTRON-INDUCED FISSION PROCESSES,
by L. E. Weaver, P. O. Strom and P. A. Killeen.
5 Mar 63, 43p.
NRDL TR633 Unclassified report

Descriptors: *Fission products, *Fission neutrons, Neutron reactions, Neutron activation, Fission, Radioactive isotopes, Uranium, Plutonium, Thermal neutrons, Tables, Measurement, Nuclear reactions.

Calculated estimates are presented of unmeasured total chain yields and of independent fission yields for the fission products resulting from fission-spectrum and 14-Mev neutron bombardment of U233, U235, U238 and Pu239 and from thermal neutron bombardment of U233, U235 and Pu239. (Author)

AD-405 844 Div. 20, 25
(TISTM/EJH) OTS price $2.60

Kansas U. Lawrence.
INTERMEDIATE STATE REORIENTATION OF COBALT-57 NUCLEI ALIGNED IN CERIUM ZINC NITRATE,
by W. W. Strohm, Jr. and R. C. Sapp. 15 May 63, 20p. TR4
Contract Nonr277500, Task NR018 202
Unclassified report

Descriptors: *Radioactive isotopes, *Single crystals, *Radioactive decay, *Cobalt, Polarization, Gamma rays, Low temperature research, Cerium compounds, Zinc compounds, Nitrates, Impurities.

Radiation pattern and linear polarization of gamma rays from decay of Co-57 aligned at low temperatures by Bleaney's method in the Y-sites of cerium zinc nitrate were studied for evidence of intermediate state reorientation in this crystal. Influence of spin-spin interactions should be negligible on theoretical grounds. Experimental results are expressed in terms of the mixing ratio delta for the 123 kev M1 + E2 gamma transition and of an attenuation coefficient Q sub k (delta = +0.148 ± 0.010, Q2 = 0.81 ± 0.10 at 1/T* = 157.) Comparisons are made with Steenberg's theory of intermediate state reorientation by static, isotropic hfs coupling in the hard core limit, and with results of another nuclear alignment experiment involving the same isotope. (Author)

21. NUCLEAR PROPULSION

AD-405 125 Div. 21, 17, 12
(TISTM/EJH) OTS price $5.60

Stanford Research Inst., Menlo Park, Calif.
ZIRCONIUM - URANIUM COMBUSTION STUDY.
Final rept., 4 Dec 61-3 Dec 62,
by Fred E. Littman. Apr 63, 54p.
Contract AF29 601 4954, Proj. 1831, Task 183101
AFSWC TDR63 15 Unclassified report

Descriptors: *Reactor fuel rods, *Zirconium alloys, *Uranium alloys, Nuclear power plants, Auxiliary power plants, Oxidation-reduction reaction, Oxidation, Hydrides, Melting, Refractory materials, Brittleness, Mechanical properties, Aerodynamic heating, Laboratory furnaces, Electric arcs, Test equipment, Re-entry vehicles.

This investigation was designed to provide an experimental verification of the melting and oxidation behavior of fuel rod material of the type used in SNAP-2 and SNAP-10A auxiliary power reactors. Samples of zirconium-uranium alloy, both hydrided and unhydrided, were subjected to static conditions approximating re-entry trajectories. Heat flux and pressure conditions encountered during re-entry were selected to bracket ballistic parameter ranges of W/C sub DA=20 to W/C sub DA=300 and altitude ranges of 400,000 to 150,000 feet. An arc image furnace capable of delivering up to 900 BTU/sq ft sec was used as a source of radiant flux. The results suggest that under these conditions no melting of the fuel rods is likely to occur. The material lost hydrogen and became almost completely oxidized. The resulting material, though mechanically weaker and more brittle than the starting material, was also extremely refractory owing to the high melting point of the zirconium oxide. (Author)

22. ORDNANCE

AD-404 774 Div. 22
(TISTP/JEA) OTS price $2.60

Picatinny Arsenal, Dover, N. J.
SAFE DISTANCES AND SHIELDING FOR PREVENTION OF PROPAGATION OF DETONATION BY FRAGMENT IMPACT,
by Leon W. Saffian. Apr 63, 21p.
PA TM1066 Unclassified report

Descriptors: *Fragmentation ammunition, *Shielding, *Explosion effects, Propagation, Detonation, Velocity, Mathematical predictions, Explosive trains, Safety, Ranges (Distance), Fragmentation, Damage.

Relationships are outlined which permit the calculation of safe distances for prevention of propagation of detonation due to fragment impact between adjacent, potentially mass-detonating systems, for any assumed degree of risk and

degree of acceptor shielding. These relationships permit prediction of probability of propagation in an existing situation, as well as calculation of necessary changes in acceptor shielding and/or separation distances for any other degree of tolerable risk. All that is necessary to develop the specific relationship for a given situation is knowledge of properties of the explosives involved and geometries of the explosive systems. A simple method for graphically representing the relationships is presented. (Author)

AD-404 853 Div. 22, 6
(TISTP/JEA) OTS price $5.60

Air Force Proving Ground Command, Eglin Air Force Base, Fla.
ENGINEERING INVESTIGATION OF IGNITION FAILURE RATE OF TAU-15/B INFRARED TARGET FLARES,
by Russell A. Bunn. May 63, 52p.
Proj. 7826W28
APGC TDR63 27 Unclassified report

Descriptors: *Rocket flares, Test methods, Flight testing, Igniters, High altitude, Targets, Flares, Infrared radiation, Effectiveness, Malfunctions, Reliability.

Unsatisfactory operation of the TAU-15/B infrared target flares had been observed when these flares were employed at high subsonic speeds and high (35,000 ft) altitude. The primary difficulty was failure of a significant percentage of the flares to burn after successful operation of the ignition squibs. Since it was believed that age of the flares may have affected their operational performance, this test was conducted to investigate the ignition failure rate of TAU-15/B flares which had been in storage since the July-October 1960 manufacturing period. Specific objectives of the test were to determine the ignition failure rate during flight at 35,000 ft altitude and mach 0.7 as well as under simulated flight conditions in an altitude chamber. It was concluded that performance of the TAU-15/B flares varies from one production lot to another and with altitude and the internal temperature of the individual flares. Results obtained under simulated altitude conditions in the altitude chamber correlated reasonably well with those obtained during airborne tests. (Author)

AD-404 903 Div. 2:
(TISTP/JEA) OTS price $2.60

Ammunition Group Pica.inny Arsenal, Dover, N. J.
MALFUNCTION INVESTIGATION OF CARTRIDGE, 81-MILLIMETER: HE, M43A1 AND M43A1B1,W/VARIOUS FUZES AND CARTRIDGE, 81-MILLIMETER: SMOKE, WP, M57A1, W/FUZE, TSQ, M77,
by John McPartland. Feb 63, 79p.
PA TR3058 Unclassified report

Descriptors: *Mortar ammunition, *Mortar fuzes, Failure (Mechanics), Smoke projectiles, Corrections, History, Tests, Test methods, Cartridges, Malfunctions, High explosive ammunition, Projectiles.

An investigation was conducted to determine the cause of malfunctions which occurred at various installations, during training exercises, involving 14 different lots of Cartridge, 81mm: HE, M43A1 and M43A1B1, with various fuzes and Cartridge, 81mm: Smoke, WP, M57A1 with Fuze, TSQ, M77. After the recommended corrective actions were taken, the remaining cartridges were released for issue and use. (Author)

AD-405 103 Div. 22, 26
(TISTM/EJH) OTS price $1.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
LABORATORY STUDIES TO DEVELOP AN IMPROVED PROCESS FOR THE STABILIZATION OF GUNCOTTON,
by Andrew F. Smetana and James W. McCahill. June 63, 15p.
Proj. 5B99 04 011
FRL TR3040 Unclassified report

Descriptors: *Nitrocellulose, *Processing, Stabilization, Impurities, Sulfates, Barium compounds, Ions, Chemical reactions, Tracer studies, Boiling.

On the basis of the 100 C vacuum stability test, it is shown that 30 hours of boiling in the presence of a 0.05-0.2 N barium ion solution is at least equivalent to the 70-hour standard hydrolytic boil in distilled water for the stabilization of guncotton. Using radioactive barium-133 and sulfur-35 to trace barium ions and sulfate groups, respectively, a chemical relationship between these two species is observed to exist in the boiling medium. The interpretation is offered from these experiments that the greater part of the total sulfate content in unstabilized guncotton is present as sulfuric acid and the remainder as sulfate half-ester. It is postulated that the action of barium ions or hard water cations in general in accelerating guncotton stabilization involves a mechanism whereby the cations chemically combine with the sulfate impurities in such a manner that these impurities do not harm the fibers. (Author)

AD-405 781 Div. 22
(TISTM/PCR) OTS price $1.60

Naval Research Lab., Washington, D. C.
UNDERWATER SHOCK WAVES FORMED BY EXPLODING WIRES,
by W. J. Vaughan. 30 Apr 63, 16p.
NRL 5901 Unclassified report

Descriptors: *Exploding wires, *Shock waves, Propagation, Circuits, Pressure, Measurement, Electric potential, Sublimation, Inductance, Capacitance, Resistance (Electrical), Geometry, Underwater explosions.

A study was made on underwater shock waves produced by exploding wires. Details on experimental equipment and procedure are given for both circuit and pressure measurements. The influence of capacitance, inductance, and gap length on maximum shock pressure P is discussed. Experimental results correlating initial capacitor voltage (between 10 and 30 kv) with P are given. An increase of voltage and gap length along with a decrease in inductance all tend to increase P. By using the empirical P vs voltage curve and extrapolating to zero P, a voltage is obtained which corresponds closely to wire sublimation energy. Reproductibility, expressed quantitatively by standard deviation, is within 2 percent. The ease of P variation, along with reproducibility, indicate the suitability of this method of shock formation as a research tool. (Author)

AD-405 889 Div. 22, 2
(TISTP/WH) OTS price $3.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
A SECOND TEST OF AN UPPER ATMOSPHERE GUN PROBE SYSTEM,
by Spence T. Marks and Eugene D. Boyer. Apr 63, 42p.
Proj. 1A011001B021 and 1M010501A005
BRL MR464 Unclassified report

Descriptors: *Upper atmosphere, *Projectiles, *Atmospheric sounding, Projectiles, Fin-stabilized ammunition, Guns.

The second phase of a high altitude gun probe project is presented. The project objectives, the design considerations, the proof tests, the vertical tests and the dispersion of the system are discussed. An altitude capability of at least 240,000 ft. and an impact circle requirement of one-mile radius was demonstrated in two series of firings on the Edgewood peninsula of the Aberdeen Proving Ground. Although the performance of this fin-stabilized, five-inch projectile was proved, the tests indicate the need for further development of data packages and fuzes. (Author)

23. PERSONNEL AND TRAINING

AD-404 847 Div. 23, 32
(TISTB/AW) OTS price $1.60

San Francisco State Coll., Calif.
THE EFFECT OF CHANGING SIZE UPON ORGANIZATIONS.
Annual rept. no. 1.
by Frederic W. Terrien. Mar 63, 7p.
Contract Nonr364600, Proj. NR177 253
Unclassified report

Descriptors: *Management engineering, *Personnel management, Group dynamics, Abundance, Distribution, Personnel, Theory.

This study is a continuation, under the auspices of the Office of Naval Research, of a project whose objective was to test the hypothesis that the administrative component of an organization increases in size at a proportionately greater rate than does the containing organization. Work is completed or planned in four fields: education, business, municipal government and the military. The hypothesis has been substantiated in a large sample of California's school districts. The first test in business, in a major banking system, did not support the hypothesis. A second test in business, utilizing a number of general hospitals of various sizes, is presently underway; with one-fourth of the sample reviewed, it so far yields a random distribution of administrative component sizes which do not relate to organization size. (Author)

AD-404 865 Div. 23, 28
(TISTM/PCR) OTS price $2.60

Bureau of Naval Personnel, Washington, D. C.
JUDGEMENTS OF SIMULATED TARGET AXIS ANGLES BY MEANS OF A PRESCRIBED CATEGORY SYSTEM,
by E. G. Aiken and W. E. Cooley. Dec 62, 16p.
NAVPERS TB62 18
Unclassified report

Descriptors: *Perception, *Naval personnel, *Performance tests, Visual acuity, Vision, Errors, Tests, Test equipment, Test methods, Statistical analysis, Analysis of variance, Plan position indicators, Target angle, Military training, Submarine personnel.

During the summer of 1961, two groups of students at the Fleet Anti-Submarine Warfare School, San Diego, were tested on their ability to make target axis angle estimates from simulated materials utilizing the angular categories in the Naval Electronics Laboratory classification system. One group received a 30 minute familiarization training period while the other was simply introduced to the task prior to testing. It is concluded that neither training nor the scope quadrant in which the stimulus appears significantly affect accuracy while the angular category does. The dominant error tendency is toward overestimation of angular size, except at the most acute angular category. Accuracy of classification within the Navy Electronics Laboratory, San Diego, system ranges from 50.2% to 89.2% depending on category, with an over-all accuracy of 68.0%. The majority of errors (92%) are of only one category in extent. (Author)

24. PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES

AD-405 772 Div. 24, 30
(TISTP/TL) OTS price $1.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
UNIVERSAL CODE FOR GENERAL PHOTOGRAMMETRIC PROBLEM.
Final rept. 8 Apr 59-1 May 63,
by Charles A. Moench. 1 May 63, 14p. F A2293
Contract DA36 034 509ORD24RD, DA Proj. TD3 03538
Unclassified report

Descriptors: *Photogrammetry, Data processing, Programming (Computers), Digital computers, Programming languages.

AD-405 808 Div. 24, 6, 30
(TISTM/DGH) OTS price $3.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
THE PERFORMANCE OF A SKYSCREEN SYSTEM USING AN ELECTRICAL ANALOGUE COMPUTER,
by Donald F. Menne. Jan 63, 37p.
BRL TN1491 Unclassified report

Descriptors: *Reconnaissance satellites, *Optical tracking, *Analog computers, Photo-theodolites, Target angle, Target designators, Tracking, Ballistic cameras.

The performance of a skyscreen system using an electrical analogue computer was demonstrated in a series of laboratory tests. Inputs for the computer are continuous analogue presentations of unrestricted azimuth and elevations angles to the target and the output is the positioning of a skyscreen aperture at the focal plane of the camera. The criterion for evaluating the performance of the system was the difference between the observed position of the skyscreen aperture and its corresponding theoretical position for selected inputs. The mean of the differences for all tests was 0.38mm. Test results indicate the acceptability of an electrical analogue computer as a component of a skyscreen system. (Author)

25. PHYSICS

AD-404 728 Div. 25
(TISTP/MFA) OTS price $1.60

Aerospace Information Div., Washington, D. C.
THE PROBLEM OF HEAT EMISSION OF SMOOTH PIPE BUNDLES IN CROSSFLOW LIQUIDS,
by A. A. Zhukauskas, V. I. Makaryavichus, and A. A. Shlanchyauskas. 16 May 63, 13p.
AID T63 69 Unclassified report

Presented at the Conference on Heat and Mass Exchange sponsored by the Belorussian Academy of Sciences, the Ministry of Higher and Secondary Special Education USSR, the Academy of Construction and Architecture USSR, and the Institute of Mechanics, Academy of Sciences USSR. The conference was held in Minsk in 1961.

Descriptors: *Heat transfer, *Temperature, *Heat exchangers, Liquids, Calorimeters, Pressure, Gas flow, Pipes, Measurement, Design.

AD-404 729 Div. 25, 9
(TISTP/WH) OTS price $2.60

Aerospace Information Div., Washington, D. C.
ANALYSIS OF MASS TRANSFER PROCESSES BASED ON CONCEPTS OF INTERPHASE TURBULENCE,
by V. V. Kafarov. 16 May 62, 20p.
AID T63 71 Unclassified report

Presented at the Conference on Heat and Mass Exchange sponsored by the Belorussian Academy of Sciences, the Ministry of Higher and Secondary Special Education USSR, the Academy of Construction and Architecture USSR, and the Institute of Mechanics, Academy of Sciences USSR. The conference was held in Minsk in 1961.

Descriptors: *Fluid flow, Fluid mechanics, Vortices, Bubbles, Turbulence, Phase studies, Heat, Surface tension.

AD-404 772 Div. 25
(TISTP/MFA) OTS price $1.60

Aerospace Information Div., Washington, D. C.
HEAT MEASUREMENTS WITH THE FLOWING HEAT COMPENSATION METHOD AND CERTAIN COMPARATIVE RESULTS,
by V. A. Grishin. 16 May 63, 17p.
AID T63 66 Unclassified report

Presented at the Conference on Heat and Mass Exchange sponsored by the Belorussian Academy of Sciences, the Ministry of Higher and Secondary Special Education USSR, the Academy of Construction and Architecture USSR, and the Institute of Mechanics, Academy of Sciences USSR. The conference was held in Minsk in 1961.

Descriptors: *Heat, Copper, Pipes, Thermocouples, Thermal conductivity, Potentiometers, Thermometers, Calibration, Heat transfer, Measurement.

AD-404 773 Div. 25, 15
(TISTP/MFA) OTS price $1.60

Aerospace Information Div., Washington, D. C.
ANALYTICAL SOLUTIONS OF A SYSTEM OF HEAT AND MASS EXCHANGE EQUATIONS FOR A SEMILIMITED MEDIUM UNDER VARIOUS BOUNDARY CONDITIONS,
by P. V. Tsoy. 16 May 63, 12p.
AID T63 65 Unclassified report

Presented at the Conference of Heat and Mass Exchange sponsored by the Belorussian Academy of Sciences, the Minstry of Higher and Secondary Special Education USSR, the Academy of Construction and Architecture USSR, and the Institute of Mechanics, Academy of Sciences USSR. The conference was held in Minsk in 1961.

Descriptors: *Heat transfer, *Heat, Fourier analysis, Integral transforms, Thermal conductivity, Operators (Mathematics), Partial differential equations, Porous materials, Equations, Theory.

AD-404 788 Div. 25
(TISTP/AM) OTS price $3.60

California U., La Jolla.
A CLASS OF ENERGY LEVELS FOR THE HEISENBERG LINEAR CHAIN. II. LEVELS NEAR THE ANTIFERROMAGNETIC GROUND STATE,
by Robert B. Griffiths. 1963, 40p. TR14
Contract Nonr221611, Proj. NR017 630
Unclassified report

Descriptors: *Atomic energy levels, *Quantum mechanics, Functions, Magnetic properties, Equations of state, Thermodynamics, Nuclear spins, Energy, Entropy, Theory, Antiferromagnetism.

The distribution of 'unbound' states in the Bethe formalism for the linear chain of spin 1/2 atoms with a Heisenbert exchange interaction between nearest neighbors is investigated in the vicinity of the antiferromagnetic ground state, utilizing the spin wave states discovered by des Cloizeaux and Pearson. An upper bound is obtained for the free energy of the antiferromagnetic chain at very low temperatures. Plausible arguments are presented to show that the 'unbound' states actually make a negligible contribution to the partition function of an infinite chain, at least in the absence of a magnetic field. (Author)

AD-404 797 Div. 25, 15
(TISTP/MH) OTS price $1.60

Microwave Lab., Stanford U., Calif.
NONLINEAR THEORY OF PLASMA OSCILLATIONS,
by P. A. Sturrock. Jan 62, 25p. 874
Contract AF49 638 415, Proj. 47501
AFOSR 1996 Unclassified report

Descriptors: *Plasma oscillations, Plasma physics, Nonlinear systems, Electrostatics, Transformations, Functions, Frequency, Electrons, Trajectories, Linear systems, Theory.

The nonlinear properties of electrostatic waves in a uniform, zero-temperature plasma free from magnetic field is investigated by two independent perturbation procedures. The first of these is the derivative-expansion technique, applied to the Lagrangian variable formalism. The second is a canonical-transformation procedure based on a Hamiltonian description. Both procedures lead to the same formula for the dominant (four-wave) interaction process. If the spectrum is one-dimensional, the wave interaction vanishes. In general, the effect of wave interactions may be divided into 'coherent' and 'incoherent' contributions. The former leads to a frequency

displacement which may be characterized by a dispersion relation. This is evaluated for a test wave in a thermally excited plasma and found to be of the standard form. The study of incoherent interaction is postponed for a subsequent article. (Author)

AD-404 802 Div. 25, 8, 9
(TISTM/PCR) OTS price $4.60

Rome Air Development Center, Griffiss Air Force Base, N. Y.
INVESTIGATION OF UNCONVENTIONAL COOLING TECHNIQUES,
by John B. McCormick and Thomas W. Walsh.
Nov 62, 43p.
Proj. 5519, Task 551904
RADC RAS TM62 6 Unclassified report

Descriptors: *Cooling, *Thermoelectricity, *Ultrasonic radiation, *Cryogenics, Materials, Manufacturing methods, Low temperature research, Power supplies, Resistance (Electrical), Resistors, Transistors, Germanium, Capacitors, Liquefied gases, Nitrogen, Electronic equipment, Solid state physics, Semiconductors, Capacitance, Electric potential, Bismuth compounds, Tellurides, Transducers (Acoustic), Titanates, Barium compounds, Silicon.

Thermoelectric and ultrasonic cooling techniques were investigated along with cooling by immersion in a cryogenic fluid. The purpose of this effort was to determine the applicability of these techniques for the cooling of electronic equipment. Experimental results are evaluated, a comparison of these techniques has been included, and recommendations concerning the application of each technique are presented. (Author)

AD-404 806 Div. 25
(TISTP/WH) OTS price $3.60

Minnesota U., Minneapolis.
THERMOELASTIC DAMPING.
Rept., 15 June 59-Sep 61,
by L. E. Goodman, C. S. Chang, and A. R. Robinson. Dec 62, 31p.
Contract AF33 657 7453, Proj. 7351, Task 735106
ASD TDR62 1031 Unclassified report

Report on Metallic Materials.

Descriptors: *Elasticity, *Deformation, *Energy, *Damping, Mathematical analysis, Heat.

The non-linear coupled field equations of thermoelasticity are herein solved for the quasi-static behavior of a solid bounded by two parallel planes. The mechanical energy converted to heat during each cycle of the loading process is explicitly evaluated and its spectral variation computed. From this exact solution an approximate, but quite general, expression for the thermoelastic energy dissipated in solids as a result of elastic deformation is developed. (Author)

AD-404 813 Div. 25
(TISTM/AMS) OTS price $5.60

Redstone Scientific Information Center, Redstone Arsenal, Ala.
CONCERNING THE STRENGTH AND STABILITY OF CYLINDRICAL BIMETALLIC SHELLS,
by E. I. Grigolyuck. 16 Apr 63, 48p.
RSIC 12
Unclassified report

Trans. from Inzhernoi Sbornik, Vol. 16, pp. 119-148, 1953.

Descriptors: *Structural shells, *Cylindrical bodies, *Composite materials, Mechanics, Stability, Thickness, Stresses, Elasticity, Deformation, Metals, Mathematical analysis.

The strength and stability of an axially symmetric, cylindrical, bimetallic shell is investigated. The shell is assumed to be thin and elastic. It is considered that the hypothesis of incompressibility of the layers and of the non-deformability of the normal element retain this force also for the bimetallic shell. Separately investigated was a shell of an infinite and finite length, and the so-called condition of reduction when applicable to the shell. Examples of calculation of shells down to the determinants of displacements and stresses, are given. In a particular case, the results for a homogeneous shell are obtained. Axisymmetric stability of the shell is investigated by linear arrangement. (Author)

AD-404 836 Div. 25
(TISTP/JEA) OTS price $3.60

Aerospace Information Div., Washington, D. C.
EXPERIMENTAL INVESTIGATION OF SLIP AND TEMPERATURE JUMP IN A FLOW OF RAREFIED AIR AROUND A SOLID WALL,
by S. I. Gribkova and L. C. Shtemenko. 16 May 63, 32p.
AID T63 64 Unclassified report

Presented at the Conference on Heat and Mass Exchange sponsored by the Belorussian Academy of Sciences, the Ministry of Higher and Secondary Special Education USSR, the Academy of Construction and Architecture USSR, and the Institute of Mechanics, Academy of Sciences USSR. The conference was held in Minsk in June 1961.

Descriptors: *Gases, *Heat transfer, Gas flow, Air, Momentum, Kinetic theory, Velocity, Differential equations, Induction heating, Measurement, Hydrostatic pressure, Statistical data, Numerical analysis, Molecules, Energy.

This article reports the results of experimental investigations of rarefied gases which show that the classical theory of gas dynamics in the Navier-Stokes approximation is correct for a wider range of conditions than that for which it was constructed. In this regard, some results are presented of investigations into the phenomena of slip and temperature jump, phenomena associated with the transfer of momentum and energy in the boundary layer of a rarefied gas. (Author)

AD-404 842 Div. 25, 15
(TISTP/MFA) OTS price $3.60

California U., La Jolla.
A CLASS OF ENERGY LEVELS FOR THE HEISENBERG LINEAR CHAIN, I,
by Robert B. Griffiths. 1963, 31p. TR13
Contract Nonr221611, Proj. NR017 630
Unclassified report

Descriptors: *Atomic energy levels, Antiferromagnetism, Functions, Integral equations, Magnetic fields, Temperature, Nuclear spins, Transformations (Mathematics) Equations, Analysis.

The highest and lowest energies as a function of the total spin are computed for the class of unbound states in the Bethe formalism for the

linear chain of spin 1/2 atoms with a Heisenberg exchange interaction between nearest neighbors. In addition, the magnetization as a function of magnetic field is calculated in the limit of zero temperature for an infinite antiferromagnetic chain. (Author)

AD-404 859 Div. 25, 4
(TISTM/AW) OTS price $1.60

General Electric Co., Schenectady, N. Y.
RESEARCH ON CdTe.
Quarterly progress rept. no. 8, 1 Feb-30 Apr 63,
by M. R. Lorenz, R. E. Halsted and B. Segall.
30 Apr 63, 21p.
Contract AF33 616 8264
Unclassified report

Descriptors: *Solid state physics, *Tellurides, *Single crystals, Electron bombardment, Crystal lattice defects, Photoconductivity, Excitation, Quenching (Inhibition), Cadmium compounds, Secondary emission.

A model for the emission process is CdTe was set up which provides an explanation for the properties of this emission. An investigation was begun with regard to the production of the double acceptor (A2) center by electron bombardment. Several experiments have demonstrated that bombardment of CdTe crystals with 1.5 Mev electrons produces the A2 center very much like the heat treatment does. These two different methods produce essentially identical results. This confirms the previous assertion that the A2 center is indeed an intrinsic lattice defect. Some photoconductivity experiments were begun on n-type samples containing the A2 center. Specifically we were interested in whether band gap excitation is necessary to bring about the trapping of holes on the A2 center at low temperatures. With the use of a series of band pass filters it was shown that excitation of the center is effected by photons in the energy range from approximately 1.0 to 0.3 ev. (Author)

AD-404 867 Div. 25
(TISTP/WH) OTS price $4.60

Warner and Swasey Co., Flushing, N. Y.
INFRARED SPECTRA AND TEMPERATURES OF PLASMAJETS: SPECTROMETRIC AND SPECTRORADIOMETRIC MEASUREMENTS OF PLASMAJET TEMPERATURE DISTRIBUTIONS.
Interim technical rept.,
by Lowell R. Ryan, Harold J. Babrov, and Richard H. Tourin. Feb 63, 36p.
Contract AF33 616 8057, Proj. 7063, Task 7063 01
ARL 63 35 Unclassified report

Report on Mechanics of Flight.

Descriptors: *Plasma jets, *Electric arcs, *Infrared spectra, Emissivity, Measurement, Argon, Helium, Nitrogen, Temperature.

Temperatures of plasmajets were measured by several optical methods and the results intercompared. Both spectrometric and spectroradiometric methods were used. Argon and nitrogen plasmajet temperatures were studied in particular detail. Large temperature gradients were observed in all plasmajets studied. Spectra of plasmas were measured in both emission and absorption over the spectral range 0.37 to 5.0 microns. Substantial emission was observed throughout the entire region. All the plasmas proved to be optically thick (measurable absorption) in the region of 0.7 - 2.0 microns and optically thin (no absorption) in the region 0.37 - 0.7 microns. (Author)

AD-404 876 Div. 25
(TISTP/WH) OTS price $4.60

Louvain U., Belgium.
EXPERIMENTAL STUDY OF CHEMI-IONIZATION IN FLAMES.
Annual summary rept. no. 3,
by A. Van Tiggelen. May 63, 1v.
Contract AF61 052 398
ARL 63 112
Unclassified report

Descriptors: *Chemical reactions, *Flames, Recombination reactions, Density, Measurement, Instrumentation, Ionization, Ions.

Observations and a complete discussion of the work achieved in the laboratory during the last three years are presented. (1) Description and discussion of two new methods for the determination of the ion concentration in the flame reaction zone (excluding the region of burned gases) by measurements of the electrical conductivity of the flame front. (2) Mass-spectrometry method of identification of the ions which can be extracted from a flame. Complete description of the equipment and summary of the most significant results. (3) Discussion of the problem of the primary process in the production of chemi-ions in the burning zone of a flame. This discussion is based on the observations which have been made not only on oxygen supported flames but also on mixtures of different fuels with nitrous oxide. (Author)

AD-404 885 Div. 25, 17
(TISTM/PCR) OTS price $2.60

Stanford U., Calif.
ELASTIC PROPERTIES RESEARCH.
Progress rept. no. 7, 1 Oct 62-31 Mar 63,
by A. J. Ardell, C. R. Barrett, H. M. Ledbetter, and O. D. Sherby. 31 Mar 63, 24p.
Contract AF33 616 6789
Unclassified report

Descriptors: *Crystals, *Grain structures (Metallurgy), *Solutions, *Creep, *Elasticity, Alloys, High temperature research, Plasticity, Metallic crystals, Atoms, Diffusion, Tensile properties, Equations, Solid state physics, Ferromagnetism, Aluminum, Heat treatment, Copper alloys, Zinc alloys, Indium alloys, Lead alloys, Theory, Gold alloys, Nickel alloys, Cadmium, Solids, Heat of activation, Materials.

Contents:
Influence of Elastic Moduli on Mechanical Property and Atomic Mobility Characteristics of Crystalline Solids at Elevated Temperature
Influence of Grain Boundary Relaxation on the Elastic Properties of Polycrystalline Aggregates
Influence of Solid Solution Alloying on the Elevated Temperature Elastic and Plastic Properties of Polycrystalline Solids
Influence of Modulus on the Temperature Dependence of the Activation Energy for Creep at High Temperatures

AD-404 910 Div. 25, 15
(TISTP/MH) OTS price $1.60

Aerospace Information Div., Washington, D. C.
SUBLIMATION OF A SOLID IN THE ENVIRONS OF A CRITICAL POINT IN A PLANE AND AXISYMMETRIC GAS FLOWS,
by V. D. Sovershennyy and G. A. Tirskiy.
16 May 63, 16p.
AID T63 68 Unclassified report

Trans. of paper presented at the Conference on Heat and Mass Exchange held in Minsk in 1961.

Descriptors: *Sublimation, Gas flow, Heat of sublimation, Incompressible flow, Gases, Boundary layer, Density, Pressure, Specific heat, Differential equations, Solid.

In this work there is obtained an exact solution for the sublimation of a solid in the environs of a critical point in a plane and axisymmetric flows of an incompressible gas. Finite ratios have been established for determining the concentration and temperature of a sublimation wave. Curves are plotted to determine the rates of advance of the sublimation front. (Author)

AD-404 919 Div. 25
(TISTP/MFA) OTS price $1.10

Redstone Scientific Information Center, Redstone Arsenal, Ala.
THE EVAPORATION OF SOLID BODIES,
by M. K. Baranaev. 16 May 63, 6p.
RSIC 13 Unclassified report

Trans. from Zhurnal Fizechoskoi Khimii, Akademiya Nauk, SSSR 20, pp. 399-402, 1946. (Copies not supplied by DDC)

Descriptors: *Solids, *Evaporation, Liquefied gases, Solidified gases, Cryogenics, Air, Diffusion, Ice, Organic compounds, Dynamics, Iodine, Vapors, Tests, Measurement.

AD-404 920 Div. 25
(TISTP/MH) OTS price $3.60

Kiel U. (Germany).
DEVELOPMENT OF METHODS FOR QUANTITATIVE SPECTROSCOPIC TEMPERATURE DETERMINATION OF PLASMAS.
Final technical rept.,
by Hans Jurgen Kusch. 30 June 62, 37p.
Grant AF EOARDC61 29
ARL 62 460 Unclassified report

Descriptors: *Plasma physics, High-temperature research, Electric arcs, Confinement, Magnetic pinch, Magnetohydrodynamics, Electromagnetic waves, Gas ionization, Spectroscopy, Electric discharges.

During the last two years at Kiel institute three ways were followed to obtain plasmas with temperatures up to 100,000 K. The first approach (pulsing an arc by high current) was not as successful as desired because confinement breaks down. The second experiment was a linear pinch. In the center of the discharge temperatures higher than 80,000 K could be measured, the radiation being emitted from thermally excited atoms. The third way is the magnetic compression of a pre-ionized discharge in helium by an outer magnetic field. Pre-ionization was effected by used of a pulsed discharge fed by a capacitor bank. Plasma parameters were determined using quantitative spectroscopic methods. Distributions of plasma parameters in space and time could be investigated by time-resolved spectroscopy. Temperature was found to be 70,000 K at most. Several methods to determine plasma parameters yielded the same results, thus proving the plasma to be in local thermodynamic equilibrium. Radiation was found to be emitted from optically thin layers. (Author)

AD-405 022 Div. 25
(TISTP/MFA) OTS price $1.10

Stanford U., Calif.
HEAT TRANSFER DURING SUBCOOLED BOILING.
Progress rept. no. 4, 16 Feb 59-31 Mar 63,
by George Leppert. 31 Mar 63, 3p. P2257
Contract DA ARO D31 124G.13
AROD 2257:3 Unclassified report

Descriptors: *Heat transfer, *Boundary layer, Nucleate boiling, Cylindrical bodies, Reynolds number, Temperature, Viscosity, Turbulence, Film boiling, Film cooling, Cooling, Liquids, Heat transfer coefficients, Measurement, Analysis.

The analysis and measurement of heat transfer from a cylindrical tube to liquid in cross-flow is examined. Although primary interest was in the subcooled nucleate boiling regime with forced convection, significant and original results were obtained for forced convection without boiling, for saturated nucleate boiling and for pool boiling. (Author)

AD-405 033 Div. 25, 9
(TISTP/WH) OTS price $1.60

Aerospace Information Div., Washington, D. C.
DEMONSTRATING THE EXISTENCE OF HEAT REGULARITY IN A BOUNDARY LAYER IN INTERNAL PROBLEM CONDITIONS,
by L. I. Kudryashev and V. A. Dzevulskiy.
16 May 63, 10p.
AID T63 70 Unclassified report

This paper was presented at the Conference on Heat and Mass Exchange sponsored by the Belorussian Academy of Sciences, the Ministry of Higher and Secondary Special Education USSR, the Academy of Construction and Architecture USSR, and the Institute of Mechanics, Academy of Sciences USSR. The conference was held in Minsk in 1961.

Descriptors: *Heat, *Boundary layer, *Heat transfer, *Gas flow, Partial differential equations, Integral equations, Thermodynamics, Pipes.

AD-405 034 Div. 25
(TISTP/WH) OTS price $1.60

Aerospace Information Div., Washington, D. C.
HEAT EXCHANGE IN THE LAMINAR BOUNDARY LAYER DURING FLOW AROUND A THIN PLATE WITH INTERNAL SOURCES,
by T. L. Perel'man. 16 May 63, 9p.
AID T63 74 Unclassified report

This paper was presented at the Conference on Heat and Mass Exchange sponsored by the Belorussian Academy of Sciences, the Ministry of Higher and Secondary Special Education USSR, the Academy of Construction and Architecture USSR, and the Institute of Mechanics, Academy of Sciences USSR. The conference was held in Minsk in 1961.

Descriptors: *Heat transfer, *Sheets, Simultaneous equations, Partial differential equations, Laminar boundary layer.

In problems of heat exchange between a body and a liquid flowing around it, as a rule, the surface temperature or heat flow through the body surface is assumed as fixed. An investigation on this assumption during intensive heat exchange is apparently inadequate, and besides, the resulting solution does not contain the functions of properties of a streamlined body (thermal-physical constants, dimensions, and so forth). This work considers the heat exchange between a thin plate with internal heat sources and the laminar boundary layer formed on it. (Author)

AD-405 035 Div. 25
(TISTP/WH) OTS price $1.60

Aerospace Information Div., Washington, D. C.
INVESTIGATION OF HEAT EXCHANGE IN THE MOVEMENT OF A DISPERSE MEDIUM IN PIPES,
by V. A. Borisevich. 16 May 63, 14p.
AID T63 63 Unclassified report

This paper was presented at the Conference on Heat and Mass Exchange sponsored by the Belorussian Academy of Sciences, the Ministry of Higher and Secondary Special Education USSR, the Academy of Construction and Architecture USSR, and the Institute of Mechanics, Academy of Sciences USSR. The conference was held in Minsk in June 1961.

Descriptors: *Heat transfer, *Particles, *Pipes, High temperature research, Boundary layer, Motion, Heat transfer coefficients, Solids, Sand.

The heat exchange process in the flow of a loose medium inside vertical pipes is investigated. The coefficient of heat exchange was determined by sections along the pipe. Dry silica sand of an average particle diameter (0.22 mm) was used in the investigation. (Author)

AD-405 046 Div. 25, 8
(TISTE/JWS) OTS price $4.60

Midwest Research Inst., Kansas City, Mo.
STUDY OF ULTRASONIC TECHNIQUES FOR THE NON-DESTRUCTIVE MEASUREMENT OF RESIDUAL STRESS.
Rept. 1 Feb 62-31 Jan 63,
by Fred R. Rollins, Jr. and Peter Waldow.
May 63, 39p.
Contract AF33 616 7058, Proj. 7360, Task 73606
WADD TR61 42, pt. 3 Unclassified report

Report on The Chemistry and Physics of Materials.

Descriptors: *Ultrasonic radiation, *Wave transmission, *Stresses, Phonons, Ultrasonic properties, Photoelasticity, Mathematical analysis, Aluminum, Magnesium, High frequency, Grain structures (Metallurgy), Transport properties, Propagation, Measurement.

The theoretical and experimental investigation of ultrasonic beam interaction in solid materials was continued. Intersection of pulsed beams (3 - 15 mc) under resonant conditions reveals that interaction does occur in many materials. A theoretically predicted third beam is generated at the point of intersection and was experimentally observed in samples of fused silica, polycrystalline aluminum, and polycrystalline magnesium. A potential method of three-dimensional stress analysis is discussed. An optical system for studying beam interaction in transparent solids is also described. (Author)

AD-405 047 Div. 25
(TISTP/WH) OTS price $6.60

Naval Ordnance Test Station, China Lake, Calif.
IMPACT AT INTERMEDIATE VELOCITIES INVOLVING CONTACT PHENOMENA,
by Werner Goldsmith. Mar 63, 58p.
NOTS TP3125 NAVWEPS 8088
Unclassified report

Descriptors: *Impact shock, *Stresses, *Mechanical waves, Beams, Rods, Metal plates, Equations, Motion, Spheres, Conical bodies, Solids, Deformation.

Theoretical relations and experimental data are presented for the collision of two objects at intermediate velocities when both wave propagation and relative indentation of the bodies must be considered. Equations are developed that combine a description of wave phenomena in beams bars, and plates with a law of contact. Experimental results are shown involving the impact of spheres and conically headed projectiles on bars and beams, and a comparison with the predictions of several theories is provided. The analytical relations are based on equations of motion treating both bars and beams as one-dimensional systems, with the effect of second-order correction factors neglected. The theory of Hertz and a simple postulate concerning perfectly plastic flow at the contact point are compared with the results of tests designed to relate experimentally the contact force as a function of the indentation in a regime where the major portion of the cross section at the point of contact remains elastic. The data were obtained from strain-gage and framing camera measurements. (Author)

AD-405 111 Div. 25
(TISTP/MH) OTS price $7.60

Aerospace Corp., Los Angeles, Calif.
REFLECTION AND TRANSMISSION OF ELECTROMAGNETIC WAVES FROM INHOMOGENEOUS MAGNETOACTIVE PLASMA SLABS,
by Richard R. Gold. 29 Mar 63, 67p. TDR169 3230 11TN12
Contract AF04 695 169
SSD TDR63 54
Unclassified report

Descriptors: *Plasma physics, Electromagnetic wave reflections, Wave transmission, Electron density, Distribution, Propagation, Electromagnetic waves, Gas ionization, Microwaves, Reentry vehicles, Ionosphere.

Exact solutions for the reflection and transmission coefficients are obtained for two general electron density distributions: kinked-trapezoid and exponential-homogeneous-exponential. Normal incidence into a stratified plasma slab is assumed so that the electromagnetic waves are propagating parallel to the free electron density gradients. A constant magnetic field is applied in the propagation direction. The solutions derived on this basis are used to evaluate the effect of the more realistic inhomogeneous plasma model, parametrically. Specific consideration is given to the analysis of transmission from a re-entry cone. The asymptotic expansion of the exact solution for the kinked-trapezoid profile provides a simplified expression for calculation purposes when L/lambda sub zero is larger than one. The analysis of problems in which L/lambda sub zero is much smaller than one is considered in some detail in the final section. (Author)

AD-405 143 Div. 25
(TISTP/TL) OTS price $5.60

Texas A. and M. Coll., College Station.
AN INVESTIGATION OF PLASTIC TORSION IN CIRCULAR PRISMATIC BARS WITH A CONCENTRIC OR ECCENTRIC HOLE USING THE SAND-HEAP ANALOGY,
by Gerald John Carey, Jr. May 63, 45p.
Unclassified report

Master's thesis.

Descriptors: *Torsion bars, Shear stresses, Moments, Stresses, Deformation, Mechanical properties, Plasticity.

AD-405 114 Div. 25
(TISTP/MFA) OTS price $3.60

Aerospace Corp., Los Angeles, Calif.
ELECTRONICS RESEARCH PROGRAM. SELECTION OF OSCILLATION MODES IN OPTICAL MASERS.
Semiannual technical rept., 1 July-31 Dec 62,
by M. Birnbaum. 23 Apr 63, 29p. TDR169 3250 22TR1
Contract AF04 695 169
SSD TDR63 84
Unclassified report

Descriptors: *Lasers, Reflectors, Oscillations, Cavity resonators, Feedback amplifiers, Solid state physics, Power supplies, Pulse generators, Ruby.

Ruby lasers formed by butting together two laser rods with plane parallel ends were shown to possess mode selection properties. The interface between the rubies acts as a partially-transparent reflector. Calculations show that the favored axial modes of the structure correspond to the frequencies for which both rods possess a Fabry-Perot type of resonance. The experimental results are in good agreement with these predictions. At high input energy (about 2-1/2 times threshold) a structure, consisting of a 3 inch and a 1-1/4 inch rod, was observed to oscillate in only three axial modes at room temperature. The reflectivity of the internal reflector and one ruby end face is obtained by virtue of the ruby/air dielectric discontinuity. The other end, which is totally reflecting, may be either a chisel or a prism. Thus, the type of mode selectivity afforded by the segmented rod structure is well adapted for very high power applications. (Author)

AD-405 117 Div. 25
(TISTP/WH) OTS price $2.60

Aerospace Corp., Los Angeles, Calif.
ON THE FREE VIBRATION OF THIN CYLINDRICAL SHELLS,
by V. I. Weingarten. 20 Dec 62, 21p. TDR169 3560 30TN3
Contract AF04 695 169
SSD TDR63 6
Unclassified report

Descriptors: *Cylindrical bodies, *Structural shells, *Vibration, Differential equations, Damping, Structures.

The free vibrations of finite cylindrical shells are investigated. With the aid of a number of simplifying assumptions, a frequency equation based on the known characteristic functions for beams with any combination of boundary conditions is obtained. Experimental results for frequency spectra and mode shapes of a cylinder fixed on one edge and free on the other are in good agreement with both Rayleigh's inextensional theory and the approximate frequency equation. Structural damping coefficients obtained for the test cylinders are compared with those of previous investigations. (Author)

AD-405 118 Div. 25
(TISTM/AW) OTS price $3.60

Aerospace Corp., Los Angeles, Calif.
MECHANISM OF GOLD DIFFUSION INTO SILICON,
by W. R. Wilcox and T. J. LaChapelle. 10 Apr 63, 35p. TDR169 3240 01TN1
Contract AF04 695 169
SSD TDR63 70 Unclassified report

In cooperation with Pacific Semiconductors, Inc., Lawndale, Calif.

Descriptors: *Gold, *Diffusion, Silicon, Solubility, Semiconductor devices, Labeled substances, Atomic structure, Temperature.

Gold was found to diffuse into Si by a complex mechanism involving a vacancy-controlled interstitial-substitutional equilibrium. This led to very complex diffusion concentration profiles. In analyzing the problem, a new experimental value was found for the self-diffusion coefficient of Si, 1.81 x 10 to the 4th power exp (-112±20 kcal/RT)sq cm/sec, which compared very favorably with previous data on diffusion of Bi, Ge, and Sn in Si. The interstitial gold-diffusion coefficient was found to be 2.4 x 10 to the minus 4th power exp (-8.9±2 kcal/RT), the substitutional gold-diffusion coefficient to be 2.75 x 10 to the minus 3rd power exp (-47±10 kcal/RT), the equilibrium-interstitial gold solubility to be 5.95 x 10 to the 24th power exp (-58±10 kcal/RT), and the equilibrium-substitutional gold solubility (Collin's data) below 1200C to be 8.15 x 10 to the 22nd power exp (-40.6 kcal/RT). (Author)

AD-405 123 Div. 25, 2
(TISTP/MFA) OTS price $7.60

Massachusetts Inst. of Tech. Cambridge.
STUDY OF THE COLLAPSE OF SMALL SOIL-SURROUNDED TUBES.
Interim rept., 15 Nov 61-15 Nov 62,
by Ulrich Luscher. Mar 63, 77p.
Contract AF29 601 4927, Proj. 1080, Task 108001
AFSWC TDR63 6 Unclassified report

Descriptors: *Soil mechanics, *Soils, *Structural shells, Pipes, Tests, Deformation, Test equipment, Tables, Numerical analysis, Differential equations, Theory, Pressure, Failure (Mechanics).

A program of experimental and theoretical work on the problem of failure of structural tubes surrounded by a thin layer of soil loaded by uniform radial outside pressures is described. The properties and the thickness of the soil layer were varied, and the failure pressure of the tube, as well as the deformations of the tube before and after failure, was observed. Theories based on idealized models of the soil-structure interaction were developed. The experimental results were then correlated with these theories to determine which, if any, of the theories explained the behavior of the samples. In addition to this work, a new testing apparatus was designed and built, in preparation for similar tests with the tube buried under a plane soil surface. (Author)

AD-405 151 Div. 25
(TISTE/JWS) OTS price $2.60

Aeronutronic, Newport Beach, Calif.
INFRARED TRANSMISSION STUDIES. VOLUME IV.
THE INFLUENCE OF NUMEROUS WEAK LINES ON THE ABSORPTANCE OF A SPECTRAL BAND.
Final rept., vol. 4,
by G. N. Plass. 12 Apr 63, 21p.
Contract AF04 695 96, Proj. 4479 730F
SSD TDR62 127, Vol. 4 Unclassified report

Descriptors: *Infrared research, *Infrared radiation, Infrared spectroscopy, Mathematical models, Spectra (Infrared), Line spectrum, Wave transmission, Absorption.

The influence of numerous weak spectral lines on band absorption is investigated. It is shown that a region of validity always exists for the weak line approximation. There is almost always also a region of validity for the strong line

approximation, unless the number of spectral lines increases very rapidly as the intensity approaches zero. The principal effects of the weak lines are to introduce points of inflection in the absorptance curves and to increase the intermediate range of values of pressure and absorber concentration over which neither the strong nor weak line approximation is valid. These effects are illustrated by examples. From a study of the shape of experimentally determined absorptance curves it is possible to deduce the number of weak lines in the frequency interval of interest. (Author)

AD-405 153 Div. 25
(TISTM/ODN) OTS price $8.60

Weidlinger, Paul, New York.
STEP LOAD MOVING WITH LOW SUBSEISMIC VELOCITY ON THE SURFACE OF A HALF-SPACE OF GRANULAR MATERIAL,
by Hans H. Bleich and Ewald Heer. Apr 63, 86p.
Contract AF29 601 2855, Proj. 1080, Task 108001
AFSWC TDR63 2 Unclassified report

Descriptors: *Surfaces, *Underground structures, *Mechanics, Internal friction, Deformation, Mathematical analysis, Materials, Loading (Mechanics), Pressure, Stresses, Theory.

The plane strain problem of a step load, p, moving on the surface of a half-space of granular material governed by internal friction and cohesion is considered because of its importance to Air Force research in protective construction. As a preliminary step towards a more complete solution, it is assumed that in regions of slip the elastic deformations may be neglected in favor of those resulting from slip. The latter assumption limits the application to Mach numbers of less than about 0.20. Two possible types of behavior of the material are considered. During slip, one material exhibits dilatancy, while the other does not change in volume. A significant finding is that for values of p above a certain limit, granular particles will be expelled at the surface ahead of the pressure front. The applied pulse will be preceded by a precursor of expelled grains. (Author)

AD-405 161 Div. 25
(TISTP/MFA) OTS price $1.10

California U., Los Angeles.
MAGNETIC EFFECTS IN SOLIDS.
Final rept., 1 June 60-1 June 63,
by David I. Paul. 1 June 63, 6p.
Contract Nonr23363, Proj. NR018 105
Unclassified report

Descriptors: *Research program administration, *Antiferromagnetism, Solid state physics, Abstracts, Magnetic properties.

AD-405 202 Div. 25, 4, 23
(TISTP/MH) OTS price $2.60

Uppsala U. (Sweden).
REPORT FROM THE INTERNATIONAL SUMMER INSTITUTE IN QUANTUM CHEMISTRY AND SOLID STATE PHYSICS HELD AT THE UNIVERSITY OF UPPSALA, UPPSALA, SWEDEN.
1963, 25p. TN88
Contract AF61 052 351
ARL63 96 Unclassified report

Descriptors: *Quantum mechanics, *Solid state physics, Symposia, Density, Matrix calculus, Biochemistry, Chemistry, Matrix algebra, Functions, Electrons, Spin.

AD-405 203 Div. 25, 15
(TISTP/MH) OTS price $1.60

Uppsala U. (Sweden).
LIMITS OF ERROR FOR THE ELECTRON DENSITY SPIN DENSITY AND ATOMIC FORM FACTORS IN QUANTUM MECHANICAL CALCULATIONS,
by L. B. Redei. 15 July 62, 14p. TN81
Contract AF61 052 351
ARL63 93 Unclassified report

Descriptors: *Quantum mechanics, Electron density, Functions, Operational calculus, Hydrogen, Atoms, Energy, Helium, Vector analysis, Spin, Density.

Explicit formulas are given for the error at an arbitrary point in the electron density, spin density and form factor derived from an approximate wave function. In the derivation, extensive use is being made of some previous results by Kinoshita. The main treatment is preceeded by a short discussion of some of the more mathematical aspects of the problem and a simple numerical example is given in the last paragraph. (Author)

AD-405 260 Div. 25
(TISTM/ODN) OTS price $1.60

Uppsala U. (Sweden).
''BOND ORBITAL'' AND ''MODIFIED ELECTRON-PAIR'' CALCULATIONS ON THE AMMONIA MOLECULE,
by Atsushi Tsuchida and Kimio Ohno. 15 Nov 62, 10p. TN87
Contract AF61 052 351
ARL 63 95 Unclassified report

Descriptors: *Ammonia, *Atomic orbitals, Electrons, Energy, Dipole moments, Quantum mechanics, Chemical bonds, Molecular structure, Theory, Molecular properties.

Non-empirical calculations of the electronic structure of the ammonia molecule are carried out using a 'bond-orbital' and a 'modified electron-pair' function. The calculated binding energy is 0.348 a.u. (76% of the experimental value) and 0.381 a.u. (83%) respectively. The best theoretical value previously known was 0.378 a.u., the result of a self-consistent LCAO calculation including limited configuration interaction. It is concluded that the 'modified electron-pair' function is an adequate simple approximation, and the 'frozen core' approximation employed in the calculation is satisfactory. The dipole moment is also calculated, and reasonable agreement with the experimental value is obtained. (Author)

AD-405 441 Div. 25, 15
(TISTP/MFA) OTS price $3.60

Uppsala U. (Sweden).
ON THE CALCULATION OF SOME ATOMIC INTEGRALS CONTAINING FUNCTIONS OF r12, r13 AND r23,
by Yngve Ohrn and Jan Nordling. 30 Nov 62, 25p. TN91
Contract AF61 052 351
ARL 63 97 Unclassified report

Descriptors: *Atomic properties, Combinatorial analysis, Polynomials, Integral equations, Quantum mechanics, Theory, Statistical functions, Functions.

Different forms of correlated atomic wave functions and their implications on the integrals occurring in calculations of variational solution to Schrodinger's equation are briefly discussed. A scheme for computing the integral is described and applied. (Author)

Division 25 - PHYSICS

AD-405 448 Div. 25
(TISTM/AMS) OTS price $8.10

Lockheed Aircraft Corp., Sunnyvale, Calif.
ON THE ORIGIN OF THE ANOMALOUS PHOTOVOLTAIC EFFECT IN ZINC SULFIDE,
by Frank A. Junga. 1 May 63, 82p. 6 90 63 20
Contract Nonr22257
Unclassified report

Technical report on physics.

Descriptors: *Zinc compounds, *Photoelectric effect, *Crystals, Crystal structure, Ultraviolet radiation, Electromagnetic waves, Piezoelectric effect, Mathematical analysis, Mathematical models, Experimental data, Electric currents, Electric potential, Crystal growth, Single crystals, Surface properties, Gamma rays, Silver, Diffusion, Heat treatment, Copper, Semiconductors, Theory, Sulfides.

It was shown that earlier models failed to account for all the features of the APE. The only objection to Hutson's model was that it was incomplete. By extending Hutson's model and formulating the problem in terms of independent photovoltage generators in each segment of the crystal, one can account for all the features of the spectral response of the APE. The expression derived for the dependence of the photovoltage on an external applied stress, together with the results of the stress experiments on mixed crystals, verifies the assumption of the origin of the photovoltage, viz., that the photovoltages arise from piezoelectric fields set up by permanent internal strains formed during the growth process. The experiment on single crystal hexagonal ZnS not only added strength to the proposed origin of the APE, but also successfully tied together the information on direction of crystal growth, pyroelectric effect, and the positive peak polarity. This experiment also verified the calculation of the photovoltage generated in a non-uniformly strained piezoelectric crystal. (Author)

AD-405 460 Div. 25
(TISTP/MH) OTS price $3.60

RAND Corp., Santa Monica, Calif.
PROPAGATION OF ACOUSTIC-GRAVITY WAVES FROM A SMALL SOURCE ABOVE THE GROUND IN AN ISOTHERMAL ATMOSPHERE,
by Allan D. Pierce. May 63, 35p. RM3596
Unclassified report

Descriptors: *Sound, Gravity, Atmosphere, Density, Mechanical waves, Sound transmission, Acoustics, Nuclear explosions, Low frequency, Acoustic properties, Energy, Intensity, Sound signals, Propagation.

This report discusses the effects of gravity and of the atmosphere's nonuniform density on sound propagation. It is part of RAND's continuing study of the atmospheric waves generated by nuclear explosions. This report should be of interest to agencies and contractors concerned with the detection of nuclear explosions. It should also be of interest to other research workers who are studying low frequency sound propagation in the atmosphere. (Author)

AD-405 482 Div. 25
(TISTP/MFA) OTS price $4.60

Dayton U. Research Inst., Ohio.
INVESTIGATION OF LASER BEAM CROSS-SECTION WITH RESPECT TO INTENSITY AND TIME.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 63,
by Werner Rambauske and Michael K. Barnoski.
31 Mar 63, 41p.
Contract AF33 657 9014
Unclassified report

Descriptors: *Lasers, *Reflection, Ruby, Polynomials, Detectors, Optical equipment, Capacitors, Photomultipliers, Circuits, Recording systems, Oscilloscopes, Time, Intensity, Analysis, Design, Measurement.

It was discovered that no two points in the laser beam cross-section displayed the same intensity versus time variation. These results were obtained by utilizing two identical detection systems positioned at various points in the beam's cross-section. Photographic recording of the dual beam scope traces are included. In addition to this, the average intensity over a 50 microsecond interval-versus-lateral distance through the beam was determined and the results plotted. A bell-shaped curve was obtained. The conclusion drawn at this point is that further investigation of the observed phenomena in the beam's cross-section is required. This investigation is presently being conducted and will be included in the final report. (Author)

AD-405 553 Div. 25
(TISTP/MFA) OTS price $1.10

New York U., N. Y.
(No title).
Status rept., 1 Sep-30 Nov 62.
30 Nov 62, 7p.
Contract Nonr28525
Unclassified report

Descriptors: *Single crystals, *Electric discharges, Electrons, Cadmium compounds, Sulfides, Copper, Light, Ultraviolet radiation, Polarization, Electric fields.

AD-405 557 Div. 25
(TISTP/WH) OTS price $1.60

Theoretical Chemistry Inst., U. of Wisconsin, Madison.
THE INTEGRATION OF THE FIRST-ORDER PERTURBED WAVE EQUATION FOR EXCITED STATES OF ONE DIMENSIONAL SYSTEMS,
by W. Byers Brown and Joseph O. Hirschfelder.
15 May 63, 16p. WIS TCI13S3
Contract AF33 657 7311
Unclassified report

Descriptors: *Quantum mechanics, *Atoms, Functions, Quadrupole moments, Operators (Mathematics), Electron transitions, Integration, Partial differential equations, Functional analysis, Perturbation theory, Excitation.

The explicit solutions of the first-order perturbation equations for a one dimensional system can be obtained by quadratures provided that the zeroth-order wave function does not have any nodes. Methods of integrating the equations are developed for excited states where the zeroth-order wave function has nodes. One of these methods is suitable for obtaining numerical solutions. (Author)

AD-405 569 Div. 25, 14
(TISTM/AMS) OTS price $2.25

Titanium Alloy Mfg. Div., National Lead Co., Niagara Falls, N. Y.
THERMOELECTRIC MATERIALS,

Final rept., Jan 60-Aug 63,
ed. by Merton H. Brooks. 31 Jan 63, 1v.
Contract NObs78326

Unclassified report

Descriptors: *Thermoelectricity, *Ceramic materials, Crystals, Semiconductors, Ionic current, Resistance (Electrical), Heat, Electricity, Oxides, Silicates, Hydrides, Titanium compounds, Niobium compounds, Barium compounds, Zirconium compounds, Yittrium compounds, Thermal conductivity, Electrical properties, Complex compounds, Lithium compounds, Magnesium compounds, Lead compounds, Chromium compounds, Tantalum compounds, Experimental data, Tables, Porosity, High-temperature research, Materials.

Three hundred twenty-three oxide, silicate, and metal hydride combinations were prepared and fabricated into test specimens by a variety of forming and firing techniques. Of these combinations, 309 were examined electrically for Seebeck effect and resistivity from 600 to 1200 C; the remaining few failed in test. None of the compositions tested gave indication of truly efficient conversion of heat to electricity; the TiO2 plus 2.0 mole percent Nb2O5 had an approximate figure of merit of 7.0 x 10 to the -5th power per degree centigrade. (Author)

AD-405 691 Div. 25, 9
(TISTP/TL) OTS price $12.00

Pennsylvania State U., University Park.
ELASTIC-PLASTIC RESPONSE OF A SLAB TO A HEAT PULSE,
by Yip-Chie Lee and Walter Jaunzemis. Mar 63, 155p. TR6
Grant AF AFOSR128 63

Unclassified report

Descriptors: *Thermodynamics, *Sheets, *Thermal stresses, Entropy, Elasticity, Hardening, Deformation, Kinetic theory, Loading (Mechanics), Stresses, Plasticity.

The objective of the present study is to establish thermodynamically valid, non-isothermal stress strain relations for the elastic-plastic range, and to obtain solutions of typical one-dimensional problems involving unsteady temperatures. In the entropy balance equation and the expression for production of internal entropy are considered. The limitations imposed by the second law of thermodynamics upon plastic flow rules are investigated, and subsequently a set of non-isothermal plastic stress strain relations is introduced. It is then shown that these relations are in accord with thermodynamic irreversibility whenever the yield criteria of Tresca and von Mises are used. Moreover, it is found that the stress strain relations of von Mises are a special case of the non-isothermal stress relations proposed here. An additional problem concerns the specification of elastic unloading from a plastic state, and in the presence of a temperature dependent yield stress. Precise criteria for elastic loading and repeated plastic flow are presented. Part II of the report is concerned with an application of the general theory to a problem for the infinite half-space constrained against lateral motion, and subjected to a heat pulse uniformly applied over its boundary. In the analysis of this problem the yield criterion of Tresca is used; the transient and steady state solutions for both strain-hardening and perfectly plastic media, having either a constant or a temperature dependent yield stress, are presented. The appearance of elastic and plastic regions of loading and unloading is studied in some detail. (Author)

AD-405 707 Div. 25, 2
(TISTP/WFA) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
DISTRIBUTION OF BRIGHTNESS OVER THE DISK OF THE MOON,
by A. Yezerskaya and V. I. Yezerskiy. 1 May 63, 12p.
FTD TT62 1928

Unclassified report

Trans. from Russian periodical, ANSSR, Astrofizicheskii sovet. Komissiya po fizike planet. Izvestiya, No. 3, pp. 68-73, 1961.

Descriptors: *Moon, *Photometers, Reflection, Surfaces, Least squares method, Photographs, Brightness, Measurement.

Photometric investigation of the distribution of brightness over the disk of the Moon has shown that along the planetocentric meridians the brightness remains constant within the limit of error, and along the equator the intensity of brightness increases continuously from the center of the disk to the limb. On the basis of these data a functional equation is found for the function expressing brightness. (Author)

AD-405 723 Div. 25, 9, 30
(TISTP/WH) OTS price $6.60

Avco Everett Research Lab., Everett, Mass.
THEORY OF STAGNATION-POINT HEAT TRANSFER IN A PARTIALLY IONIZED DIATOMIC GAS,
by James A. Fay and Nelson H. Kemp. Apr 63, 60p.
RR144
Contract AF04 694 33
BDS TDR62 347

Unclassified report

Descriptors: *Heat transfer, *Atmosphere entry, *Diatomic molecules, *Stagnation point, Thermodynamics, Electrons, Theory, Diffusion, Gas ionization, Transport properties, Thermal conductivity.

Stagnation-point heat transfer in a partially ionized diatomic gas is considered. The concept of frozen thermal conductivity is used, and a simplified binary diffusion model of the gas is proposed. In this model the charge-exchange cross-section for atom-ion collisions is taken to be infinite so there is no relative diffusion of the atoms and the ion-electron pairs. This permits the diffusion effects to be dealt with as if there were only two components, molecules and atom-ion-electron particles, and thus greatly simplifies the calculations. However, the thermodynamic and transport properties are evaluated using all four components, molecules, atoms, ions, and electrons. With this model, calculations are made for both frozen and equilibrium boundary layers in nitrogen up to about 60,000 ft/sec, and arguments are presented for applying the results to air. The results show the equilibrium heat transfer rate to be progressively smaller than the frozen rate as the velocity increases above 30,000 ft/sec, the ratio reaching 2/3 at 50,000 ft/sec. Simple correlation formulas for the results are given. (Author)

AD-405 730 Div. 25, 26, 8
(TISTM/PCR) OTS price $9.60

Minnesota U., Minneapolis.
RESEARCH ON PHOTOEMISSION.
Final rept., 16 Dec 61-15 Dec 62,
ed. by W. T. Peria. Mar 63, 105p.
Contract AF33 657 8041, Proj. 4156, Task 415605
ASD TDR63 340

Unclassified report

Descriptors: *Photoelectric effect, *Sodium, *Semiconducting films, Photoelectrons, Crystal structure, Sodium compounds, Antimony alloys, Vacuum apparatus, Electron diffraction analysis, Crystals, Germanium, Adsorption, Secondary emission, Thickness, Temperature, Electrical conductance, Hall effect, Evaporation, Pumps, Titanium, Discharge tubes, Argon, Ion sources, Electron guns, Capacitors, Crystal lattices, Field emission, Microscopes, Quartz, Materials, Coatings, Manufacturing methods.

Techniques used to obtain high vacua, to provide clean surfaces, to deposit Na on these surfaces and to measure their work functions are described. A method used to fabricate hemispherical grids is also included. Work function, electron diffraction and secondary emission studies of sodium-covered germanium are presented. Preparations for a field-emission study of the same system are described. In the study of the compound Na_3Sb, preliminary data on the details of film formation have been obtained and the inert atmosphere facility for the preparation of the bulk material has been completed. A brief description of the apparatus to be used in the study of anomalous photovoltaic effects in Ge films is given. (Author)

AD-405 732 Div. 25
(TISTP/MFA) OTS price $12.00

Defense Documentation Center, Cameron Station, Alexandria, Va.
PLASMA PHYSICS AND MAGNETOHYDRODYNAMICS,
comp. by Merrill F. Aukland. June 63, 1v.
Unclassified report

Descriptors: *Bibliographies, *Plasma physics, Plasma jets, Plasma oscillations, Plasma sheath, Gas ionization, Electromagnetic waves, Microwaves, Nuclear physics, Shock tubes, Shock waves, Atmosphere entry, Magnetic pinch, Symposia, Abstracts, Magnetohydrodynamics.

This supplement is an updating of the DDC report bibliography on Plasma Physics and Magnetohydrodynamics. The first unlimited unclassified bibliography on this subject appeared under AD-271 170 a little over a year ago. The format is similar to the original printing in that alphabetic subject breakdown has been organized from the abstract cards. There are no duplicate entries and where a reference might well occur under two or more subjects the compiler has had to arbitrate. Within each subject area reports prepared by Department of Defense contractors are listed alphabetically by source, contract and title; military reports are arranged by source and title. (Author)

AD-405 745 Div. 25
(TISTP/MH) OTS price $5.60

Brown U., Providence, R. I.
A COOPERATIVE PROGRAM OF FUNDAMENTAL RESEARCH AS RELATED TO JET PROPULSION OFFICE OF NAVAL RESEARCH, DEPARTMENT OF THE NAVY,
by H. Iwasaki and J. Kestin. Apr 63, 47p. TR BRN4P
Contract Nonr3623 00, Proj. NR098 038
Unclassified report

In cooperation with Virginia U., Charlottesville.

Descriptors: *Argon, *Helium, Viscosity, Mixtures, Fluid flow, Barometric pressure, Density, Helium group gases, Pressure, temperature, Suspension devices, Viscosity.

The paper describes the details and results of a precise, absolute determination of the viscosity of argon-helium mixtures at 20 degrees C and at 30 degrees C, both from 1 to 50 atm pressure. The accuracy of the measurements is estimated to be ± 0.2% at worst, but the relative values with respect to the pure gases are thought to be precise to ± 0.04%. It is found that the excess viscosity of all mixtures is a unique function of density, rho, certainly to order rho, and approximately, but with an error comparable to that of the determination, also to order rho squared. (Author)

AD-405 746 Div. 25
(TISTP/MH) OTS price $1.60

Illinois U., Urbana.
A COOPERATIVE PROGRAM OF FUNDAMENTAL RESEARCH AS RELATED TO JET PROPULSION OFFICE OF NAVAL RESEARCH, DEPARTMENT OF THE NAVY,
by R. C. Dimick and G. J. Trezek. Apr 63, 13p. TR ILL 8 P
Contract Nonr362300, Proj. NR098 038
Unclassified report

In cooperation with Virginia U., Charlottesville, Va.

Descriptors: *Probes, Diodes, Photoelectric cells, Semiconductors, Distribution, Gas flow, Resistance thermometers, Thermocouples, Thermistors, Electrometers, Heat, Transients, Temperature sensitive elements, Temperature.

A temperature probe capable of reading temperature deviations of 0.005 F or less at ambient temperatures was developed using the large temperature coefficient of the reverse current of a Cylvania 1N77B photodiode. The photodiode case, a 0.072 in. dia. x 0.80 in. long glass cylinder, makes possible a small but very rugged probe assembly. (Author)

AD-405 747 Div. 25
(TISTP/MH) OTS price $2.60

Illinois U., Urbana.
THERMAL ELECTRIFICATION AND IONIZATION OF SOLID PARTICLES,
by S. L. Soo. Apr 63, 22p. TR ILL 10 P
Contract Nonr362300, Proj. NR098 038
Unclassified report

In cooperation with Virginia U., Charlottesville, Va.

Descriptors: *Particles, Electrons, Space charges, Gases, Thermionic emission, Electromagnetic fields, High-temperature research, Energy, Electrical conductance, Field emission, Ionization.

Distribution of an electron cloud around a solid particle charged by thermal electrification was studied. The case considered includes a solid particle in a finite volume consisting of a vacuum or a gas-filled environment. It was shown that most of the electrons emitted by thermionic emission are bounded by the charge of the solid particle. Ionization of this system can be produced by an electromagnetic field or scattering by gas molecules. (Author)

AD-405 754 Div. 25
(TISTP/WH) OTS price $4.60

Microwave Research Inst. Polytechnic Inst. of Brooklyn, N. Y.
THE ELECTROMAGNETIC FIELDS OF CERTAIN UNIAXIALLY

ANISOTROPIC DIELECTRIC SLABS,
by Frank M. Labianca. 9 Apr 63, 41p. PIBMRI1151 63
Grant AFOSR62 295

Unclassified report

Descriptors: *Electromagnetic fields, *Dielectrics, *Propagation, Plasma physics, Waveguides, Anisotropy.

Two problems are considered. In the first problem, the properties of surface waves propagating in a slab of uniaxially anisotropic dielectric are studied. The slab is of finite thickness and the relative dielectric constants of the dielectric tensor are all positive. Two cases are studied simultaneously, one being the case where the optical axis is chosen parallel to the slab, and the other being the case where the optical axis is chosen perpendicular to the slab. Only E-mode surface waves are studied since these have the properties of extraordinary type waves. A transverse resonance procedure is utilized in the determination of the surface wave resonances. It is found that at any frequency the resonances are finite in number. In the second problem, the electromagnetic fields of a uniaxially anisotropic plasma slab in the presence of a magnetic line source are studied. The geometry is the same as for the first problem, except that the optical axis is chosen parallel to the slab and perpendicular to the direction of the line source. (Author)

AD-405 764 Div. 25, 7, 8
(TISTP/AM) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
A DEVICE FOR THE DETERMINATION OF CORE FREQUENCY PROPERTIES IN THE RE-MAGNETISATION PROCESS ALONG HYSTERESIS SYMMETRIC CYCLES CLOSE TO A LIMITING HYSTERESIS LOOP (Pribor dlya opredeleniya chastotkhykh svoystv serdechnikov pri peremagnichivanii po simmetrichnym tsiklam gisterezisa, vlizkim k predel'nym),
by E. F. Berezhnoy. 6 May 63, 17p.
FTD TT62 1870 Unclassified report

Elektronnyye Vychislitel'nyye Mashiny, Moskva, pp. 1-16, 1962.

Descriptors: *Magnetic cores, *Frequency meters, Hysteresis, Electronic equipment, Circuits, Switching circuits, Computer storage devices, Magnetism, Electromagnetic properties.

AD-405 814 Div. 25
(TISTP/MH) OTS price $5.60

Institute of Engineering Research, U. of Calif., Berkeley.
A SPECTROSCOPIC STUDY OF RECOMBINATION IN A HELIUM PLASMA,
by F. A. Robben. 5 Apr 63, 48p. 132 7 and HE150 211
Contract AF49 638 502

Unclassified report

Descriptors: *Plasma physics, *Helium, Spectroscopy, Recombination reactions, Ions, Gas ionization, Electrons, Models, Electromagnetic waves, Electric arcs, Plasma jets, Ultraviolet radiation, Atomic energy levels.

Recent work on ion-electron recombination has shown that a model involving recombination into highly excited bound levels through electron-electron-ion collisions and transitions between the bound levels through electron-atom collisions as well as the usual radiative processes, is in good agreement with experiment. By making absolute intensity measurements of all the lines of helium emitted from the decaying plasma of an arc jet in the visible and near ultraviolet, the number densities of the excited states of helium were calculated. When interpreted by means of the collisional-radiative recombination model, these measurements give values for the collisional de-excitation rate constant of an excited helium atom from level n to n-1. The values of this constant are in reasonable agreement with a recent theory of classical excitation cross sections. A square root dependence of this cross section on the excess energy is indicated, since the values of the collisional de-excitation rate constant appear to be independent of temperature. (Author)

AD-405 815 Div. 25, 30, 6
(TISTP/JEA) OTS price $8.60

University of Southern Calif., Engineering Center, Los Angeles.
A SURVEY OF METHODS FOR DYNAMIC SYSTEM IDENTIFICATION AND RESEARCH IN OPTICAL COHERENCE.
Final rept.,
by Robert B. McGhee, Gregory O. Young, and Robert S. Macmillan. Mar 63, 81p. 97 101; EE22
Contract AF49 638 893

Unclassified report

Descriptors: *Infrared optical systems, *Mathematical models, *Identification systems, Computer logic, Optical images, Optical filters, Statistical functions, Integral equations, Transducers, Integral transforms, Pattern recognition, Programming (Computer), Numerical methods and procedures, Correlation techniques, Special functions, Nonlinear systems, Numerical analysis, Automation, Functional analysis, Servomechanisms, Optical tracking, Lasers, Linear systems.

The parameter space approach is believed to represent a new point of view regarding the general problem of system identification. The method is restricted only by the requirement that a parametric model of finite dimensionality must be provided for the system under test. The parameter space method involves the determination of transformations defined over a finite dimensional vector space rather than over a Hilbert space. In addition to the computational advantages gained by a parameter space approach, there is the further advantage that no special test signals are required as in the Wiener theory. The model for a nonlinear system can be inferred from normal operating records. The current phase of this research is directed toward the development of explicit computational procedures for carrying out the proposed minimization of error functionals by parameter space methods. A detailed study of certain aspects of the theory of optical coherence was carried out. (Author)

AD-405 822 Div. 25
(TISTP/MFA) OTS price $6.60

Plasma Physics Research Lab., U. of Minn., Minneapolis.
PROPERTIES OF VACUUM AND GAS DIODES,
by H. J. Oskam and C. Bruce Johnson. Mar 63, 1v. SR1
Contract AF19 604 8072

Unclassified report

Descriptors: *Plasma physics, *Diodes, Thermionic converters, Thermionic emission, Electrons, Density, Velocity, Gases, Equations, Electric fields, Charged particles, Cathodes, Electronic equipment, Measurement, Diffusion, Circuits, Gas discharges, Design.

The properties of vacuum and gas diodes are discussed. The equations describing the properties of these two types of diodes are compared for the situation in which the diode current is space-charge limited. The screen anode of an auxiliary discharge is used as the cathode of the gas diode and the properties of this type of cathode are studied and the experimental results reported. (Author)

AD-405 837 Div. 25, 6, 2
(TISTP/MB) OTS price $3.60

Acoustics and Seismics Lab., U. of Michigan, Ann Arbor.
ACOUSTIC BACKGROUND AT THE EARTH'S SURFACE.
Final rept.,
by John W. Wescott and S. Steven Kushner.
Feb 63, 31p. 3746 35 F
Contract DA20 018ORD22840
Unclassified report

Descriptors: *Acoustic detectors, Acoustics, Noise, Turbulence, Sound generators, Airplane noise, Microwave relay systems, Data transmission systems, Wind, Sound transmission, Sound ranging, Detectors, Detection, Acoustic equipment.

Acoustic background noise at the earth's surface for frequencies from 0.2 to 100 cps was monitored outdoors with two low-frequency condenser microphones placed 1500 feet apart. The wind speed at each microphone was monitored with cup anemometers. Data were transmitted by microwave links to a central receiving station and recorded on magnetic tape. The acoustic data were preemphasized 6 db/octave before transmission to improve signal-to-noise ratios. Oscillograms of the multichannel acoustic data show cross-correlations by visual inspection for the sounds radiated from upper-air turbulence and aircraft. Oscillograms of noise generated locally by surface winds show no apparent cross-correlation. Details of instrumentation are presented. These include a block diagram of the detection, data-link, and recording system and circuit diagrams of components developed for it. A pistonphone calibrator with pushbutton frequencies from 0.125 to 30 cps is described, and its use for amplitude and phase calibration of microphones is explained. (Author)

AD-405 854 Div. 25, 9
(TISTP/WH) OTS price $.50

Naval Research Lab., Washington, D. C.
A BRIEF SURVEY OF ELEMENTARY THERMOELECTRIC THEORY,
by William H. Lucke. 3 May 63, 15p.
NRL 5888
Unclassified report

Descriptors: *Thermoelectricity, *Electrons, Theory, Transport properties.

The three fundamental effects of thermoelectricity - Seebeck, Peltier, and Thomson - are presented and the corresponding coefficients are defined. Following a simplified derivation of the Kelvin relations, a more sophisticated and detailed presentation of the irreversible thermodynamic approach to these relations is made. It is demonstrated that these relations are valid in spite of the arbitrary assumptions as the separation of thermal and electrical conduction made in the former derivation. Next, a brief summary is given of a derivation of the expression for the Seebeck coefficient based on a quasi-free electron model and simple energy dependence of an isotropic relation time. In closing, the attempt to apply band theory to the search for better thermoelectric materials is briefly described and some interesting ideas for improvement are mentioned along with criticisms concerning predictions of the maximum possible figure of merit. (Author)

AD-405 863 Div. 25
(TISTP/MFA) OTS price $1.10

Institute of Optics U. of Rochester, N. Y.
INVESTIGATIONS OF THE OPTICAL DETECTION OF HYPERFINE RESONANCES IN ALKALI VAPORS.
Quarterly progress rept. no. 5, 15 May-15 Aug 62,
by C. O. Alley. 15 Aug 62, 4p. 5
Contract DA36 039sc87273
Unclassified report

Descriptors: *Standards, *Hyperfine structure, Line spectrum, Optical equipment, Polarization, Ultraviolet radiation, Lithium compounds, Fluorides, Rubidium, Reflection, Hydrogen, Atomic spectroscopy, Flash lamps, Vapors, Frequency, Optical analysis.

Experimental investigations using a vacuum ultraviolet monochromator showed that a substantial degree of linear polarization of Lyman-alpha radiation (1216 angstrom) can be produced by successive reflections at the Brewster angle (approx. 60 degrees) from cleaved surfaces of lithium fluoride. Two successive reflections gave a ratio of intensities in the plane of incidence and perpendicular to the plane on the order of 1:10, as determined by a third LiF surface as analyzer, with a transmission on the order of 10% for two reflections. (Author)

AD-405 869 Div. 25
(TISTP/WH) OTS price $8.10

Air Force Cambridge Research Labs., Bedford, Mass.
ON THE CHARACTERISTICS OF A GLOW DISCHARGE BETWEEN COAXIAL CYLINDERS IMMERSED IN A MAGNETIC FIELD,
by Joseph E. Hoffman, Jr. Apr 63, 84p.
Proj. 5633
AFCRL 63 121 Unclassified report

Descriptors: *Magnetic fields, *Electrodes, Brass, Aluminum, Electrical properties, Glow discharges, Gas discharges, Vacuum apparatus.

The effect of a strong magnetic field on the glow discharge between coaxial brass or aluminum cylinders is investigated. Pressures range from one to two hundred microns and the magnetic field varies from zero to five hundred gauss. Ignition and sustaining voltages are plotted against field strength and pressure. Tube current versus field strength is plotted with pressure and terminal voltage as parameters. Also, tube current versus terminal voltage is plotted with pressure and field strength as parameters. Comparison with the results of previous investigators and with available theory is made. (Author)

AD-405 888 Div. 25, 2
(TISTP/MFA) OTS price $4.60

Naval Weapons Lab., Dahlgren, Va.
ACOUSTIC RAYS IN AN OCEAN WITH HEAT SOURCE OR THERMAL MIXING ZONE,
by Hans J. Lugt and Peter Ugincius. Mar 63, 1v.
NWL 1854 Unclassified report

Descriptors: *Acoustics, *Water, Oceanology, Differential equations, Thermal radiation, Sound, Velocity, Temperature, Salinity, Heat transfer, Functions, Surface properties, Oceans, Refractive index.

The eikonal equation of ray acoustics is discussed for the general case, with the index of refraction a function of the three space coordinates. Two examples illustrating the influences of a two-dimensional heat source and a thermal mixing zone on the acoustic ray paths are presented. Numerical results show that, for long-range acoustical ray tracing, inhomogeneities of the ocean in the horizontal plane can cause refraction effects, which are not negligible in comparison with effects in the vertical direction. Rays, which travel in the vicinity of a heat source, can be refracted as much as 6 deg. Thermal mixing zones can increase the range of shadow zones near the ocean surface up to 50%. Even new shadow zones can be formed. (Author)

AD-405 890 Div. 25
(TISTM/ODN) OTS price $9.10

Linde Co., Div. of Union Carbide Corp., Tonawanda, N. Y.
RESEARCH STUDY OF THE CRYOTRAPPING OF HELIUM AND HYDROGEN DURING 20 K CONDENSATION OF GASES. PHASES I AND II,
by R. A. Hemstreet, D. J. Webster, D. M. Ruttenbur, W. J. Wirth, and J. R. Hamilton.
May 63, 1v.
Contract AF40 600 945, Proj. 7778, Task 777801
AEDC TDR63 127 Unclassified report

Descriptors: *Oxygen, *Nitrogen, *Helium, *Hydrogen, *Organic compounds, Adsorption, Test facilities, Space environmental conditions, Vacuum pumps, Diffusion pumps, Low pressure research, Carbon dioxide, Solidified gases, Gases, Surfaces, Probability, Theory, Condensation, Cryogenics, Organic compounds (Others).

A study of the variables affecting cryotrapping of helium and hydrogen during 20 K condensation of oxygen and nitrogen is presented. The mechanism of helium trapping appears to involve burying helium atoms in the solid oxygen or nitrogen. The process is most efficient at high condensation rates, but is not likely to find application for the removal of helium in a large space chamber. Experimental results indicate that hydrogen trapping occurs by adsorption of hydrogen molecules on the surface of the solid oxygen or nitrogen and is most efficient at low condensation rates and low heat flux to the solid surface. These conditions indicate that hydrogen trapping may be applicable for hydrogen removal in a large space chamber. Attempts to improve helium trapping by ionizing the atoms and collecting them on a charged 20 K surface were unsuccessful. The trapping of hydrogen by nitrogen condensed on a 20 K surface was studied under conditions where the surface was shielded from ambient temperature radiation. The process is shown to be an inefficient means for hydrogen pumping and is likely to have value only as a bonus in the operation of a large space chamber. (Author)

AD-405 894 Div. 25
(TISTP/MH) OTS price $1.75

Oklahoma State U., School of Civil Engineering, Stillwater.
LIQUIDBORNE NOISE REDUCTION VOLUME II,
Final rept.,
by Edwin J. Waller and Larry E. Hove. Feb 63, 63p. RP8
Contract NObs 86437, SF013 11 01, Task 1359
Unclassified report

Descriptors: *Noise, Cavitation noise, Acoustic properties, Turbulence, Fluid flow, Acceleration, Pumps, Pistons, Valves, Intensity, Piping, Functions, Liquids.

This report summarizes the work performed under contract NObs 86437 during the period February 1 1962, to January 31, 1963. Work is continuing under contract NObs 88297 which terminates January 31, 1964. The overall objective of this project was to aid the Bureau of Ships in prevention of excessive liquidborne noise levels at critical points in shipboard piping systems. (Author)

26. PRODUCTION AND MANAGEMENT

AD-404 782 Div. 26, 17
(TISTM/AMS) OTS price $1.60

Battersea Coll. of Tech. (Gt. Brit.).
USE OF REACTIVE ATMOSPHERES FOR THE TREATMENT OF B.C.C. METALS.
Quarterly engineering progress rept. nos. 1. and 2, 1 Oct 62-31 Mar 63,
by R. L. Jarmet. 31 Mar 63, 12p.
Contract N62558-3591
Unclassified report

Descriptors: *Sintering, *Tungsten, Temperature, Controlled atmospheres, Powder metallurgy, Iodine, Hydrogen, Argon, Halogens, Low pressure research.

AD-404 805 Div. 26, 33
(TISTM/AMS) OTS price $10.10

Army Chemical Corps., Army Chemical Center, Md.
HANDLING AND STORAGE OF NITROGEN TETROXIDE.
May 63, 115p.
Contract AF33 616 60 20, Proj. 8119, Task 811906
RTD TDR63 1033 Unclassified report

Descriptors: *Liquefied gases, *Propellants, Storage, Nitrogen compounds, Tetroxides, Peroxides, Dioxides, Fuels, Industrial equipment, Design, Chemical properties, Stability, Liquids, Vapors, Hazards, Safety, Toxicity, Fires, Explosions, Disposal, Neutralization, Material control, Instruction manuals, Handling.

A comprehensive source of basic information for use in the design, fabrication, and operation of nitrogen tetroxide handling equipment. The chemical and physical properties of this propellant are included so that the hazards will be recognized and understood. Principles underlying the prevention of fire, explosion, and toxic effects are presented, along with the information on the disposal and neutralization of vapors and liquids. (Author)

AD-404 831 Div. 26, 8
(TISTM/AMS) OTS price $1.75

Aeroprojects, Inc., West Chester, Pa.
ULTRASONIC WELDING PROCESS AND EQUIPMENT FOR CONSTRUCTION OF ELECTRON-TUBE MOUNTS.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 62,
by William Rosenberg. 31 Dec 62, 17p.
Contract DA36 039sc86741
Unclassified report

Descriptors: *Welding, *Ultrasonic radiation, *Electron tube parts, Wire, Test, Experimental data, Fatigue (Mechanics), Welds, Manufacturing methods, Industrial equipment, Sheets, Tensile properties, Shear stresses, Impact shock, Microstructures, Toughness.

Results of welding 82 combinations of materials and geometries are presented. An evaluation program for all successfully welded combinations was established. Progress in the effort to use ultrasonic welding in the manufacture of three specific electron tubes is reported. (Author)

AD-405 135 Div. 26, 17
(TISTM/AMS) OTS price $2.60

Nuclear Metals Inc., Concord, Mass.
DEVELOPMENT OF DIES FOR EXTRUSION OF COMPLEX SHAPES OF STEEL AND REFRACTORY ALLOYS.
Interim technical documentary progress rept., 1 Jan-31 Mar 63,
by J. G. Hunt, J. L. Klein, A. M. White and R. G. Jenkins. May 63, 20p.
Contract AF33 657 8798, ASD Proj. 7 946 and NMI Proj. 1597
ASD TDR7 946 P3 Unclassified report

Descriptors: *Dies, *Extrusion, Supports, Steel, Molybdenum alloys, Heat resistant metal and alloys, Titanium compounds, Borides, Aluminum compounds, Oxides, Zirconium compounds, Carbides, Silicides, Molybdenum compounds, Tungsten, Silicon alloys, Nitrides, Cermets, Magnesium compounds, Test methods, Industrial equipment, Intermetallic compounds, Hot working, Forging, Design, Fibers, Reinforcing materials, Ceramic materials, Brittleness, Melting, Ceramic coatings, High temperature research.

Work continued on methods of fabricating and evaluating dies suitable for the high temperature extrusion of steel and refractory metals of complex shapes. Fabrication of ceramic and intermetallic dies by hot pressing and by melting and forging continued. Successful methods of producing tungsten fibers for reinforced dies were developed. A die support system based on the concept of hydrostatic support for the die casing has been developed and shown to be successful in preventing the cracking of brittle die nibs during extrusion. (Author)

AD-405 735 Div. 26, 14
(TISTM/ODN) OTS price $1.10

Meier, Vincent, Port Washington, N. Y.
DESICCATING BARRIERS FOR MILITARY PACKAGING.
Rept. for 1 Feb-1 May 63.
1 May 63, 4p. TR2
Contract NOw63 0155
Unclassified report

Descriptors: *Containers, *Desiccants, Films, Materials, Gelatins, Polyvinyl alcohol, Lithium compounds, Chlorides, Military requirements.

The aim of this study is to develop new and superior packaging systems and materials capable of producing a dehumidified or moisture controlled atmosphere similar to that presently produced by Method II of Specification MIL-P-116D, at a lower cost and greater efficiency. The work consisted mainly of studies on desiccating materials capable of producing the desired effect when used in conjunction with barrier material components. The work is continuing in line with presently promising results. (Author)

AD-405 810 Div. 26, 17
(TISTM/AMS) OTS price $1.25

Solar, San Diego, Calif.
DEVELOPMENT OF LOW TEMPERATURE BRAZING ALLOYS FOR TITANIUM HONEYCOMB SANDWICH MATERIALS.
Final rept., 1 Dec 61-30 Nov 62,
by W. C. Troy. Jan 63, 41p.
Contract AF33 616 7249, Proj. 7351, Task 735102
ASD TR61 313 P2 Unclassified report

Report on Metallic Materials.

Descriptors: *Titanium alloys, *Honeycomb cores, *Brazing, Sandwich construction, Sandwich panels, Silver alloys, Copper alloys, Germanium alloys, Tin alloys, Joints, Tests, Microstructure, Magnesium alloys, Lithium alloys, Aluminum alloys, Vanadium alloys, Brittleness, Tensile properties, Vacuum apparatus, Eutectics, Temperature.

For brazing titanium under 1100 F, binary information formed the basis of selecting two promising ternary basis alloys for development, (1) Ag-Cu-Ge and (2) Ag-Cu-Sn. Melt and flow behavior was favorable with Ag-Cu-Sn base alloys, but work was discontinued because of excessive joint brittleness related to intermetallic films formed on the substrate. Alloys based on the Ag-Cu-Ge ternary also formed intermetallic films, but the joints had intermediate strength which justified evaluation. Average shear strength of lap joints varied from 10,750 psi for aged specimens to 11,900 psi for specimens after brazing at 1100 F. These marginal properties would justify only limited application of the Ag-Cu-Ge based alloys. (Author)

AD-405 896 Div. 26, 17
(TISTM/BRW) OTS price $.50

Aeroprojects Inc., West Chester, Pa.
INVESTIGATION OF ULTRASONIC WELDING OF REFRACTORY METALS AND ALLOYS,
Bimonthly progress rept. no. 4, 16 Feb-15 Apr 63.
May 63, 11p.
Contract NOw63 0125c
Unclassified report

Descriptors: *Heat resistant metals and alloys, *Welding, Aluminum alloys, Stainless steel, Nickel alloys, Spot welding, Industrial equipment, Ultrasonic radiation.

A laboratory-type 4-kw spot-welding machine was instrumented for power-force programming. Preliminary investigations using this improved technique were carried out in the welding of 2024-T3 bare aluminum, A1S1 304 stainless steel, and Inconel X alloys. Efforts to procure adequate quality refractory metals were continued. (Author)

27. PROPULSION SYSTEMS

AD-404 785 Div. 27, 30
(TISTA/GEC) OTS price $3.00

Bolt, Beranek and Newman, Inc., Cambridge, Mass.
NOISE CONTROL FOR AIRCRAFT ENGINE TEST CELLS AND GROUND RUN-UP SUPPRESSORS. VOLUME 3: AN ENGINEERING ANALYSIS OF MEASUREMENT PROCEDURES AND OF DESIGN DATA.
Final rept.,
by Norman Doelling. Nov 61, 161p.
Contracts AF33 616 3335 and AF33 616 3938,
Proj. 7210, Task 71708
WADC TR58 202, Vol. 3 Unclassified report

Report on The Generation, Propagation, Action and Control of Acoustic Energy.

Descriptors: *Turbojet engines, *Jet engine noise, Ground support equipment, Acoustics, Reduction, Diffusers, Measurement, Test methods, Instrumentation, Analysis, Attenuation, Test facilities, Damping.

The physical aspects of noise control in aircraft engine test cells and ground run-up suppressors are reported. The measurement procedures and the noise reduction data that form a technical basis for many of the techniques and ideas presented in the other volumes are analyzed. Errors arising from the measurement equipment, wide-band frequency analysis, random variations of noise level in time and space, the use of artificial noise sources, variations in air flow conditions and different measurement procedures are investigated to obtain an objective measure of the reliability of data obtained from an AF sponsored program of acoustical evaluations of test cells and ground run-up suppressors. Data on impervious barriers and noise control components for air passages are analyzed. The performance of a single wall barrier can be reliably estimated, but the large noise reductions expected from double wall barriers are seldom obtained because of flanking paths. The performance of noise control components for air passages was found to differ significantly from that predicted by theory (first order modes, long treatment). (Author)

AD-404 838 Div. 27, 12
(TISTP/JEA) OTS price $1.10

Martin-Marietta Corp., Denver, Colo.
MISSILE SM68B-15 MISSILE VERIFICATION FIRING,
by H. Campbell. 13 May 63, 8p. CR63 92
Contract AF04 647 213
Unclassified report

Post firing captive test report, rev. 1.

Descriptors: *Guided missiles, *Checkout procedures, Non-destructive testing, Checkout equipment, Hydraulic systems, Power supplies, Instrumentation, Gas-generating systems, Measurement, Telemeter systems, Reliability, Tests.

This is a summary of Missile Verification Firing (MVF) of Missile B-15 performed by the Martin Company at the Denver Test Stand. Missile B-15 contained the first IRSS to be tested during an MVF. All T.M. data was played back by A. C. Spark Plug due to the format deviations between the PCM TM systems. This contributed to the instrumentation checkout and data reduction problems encountered on this missile. The A. C. Spark Plug guidance system was simulated. Airborne batteries were used for the MVF. (Author)

AD-404 921 Div. 27, 12
(TISTA/GEC) OTS price $3.60

Aerospace Corp., Los Angeles, Calif.
A GENERAL STRUCTURAL CRITERIA USED IN SYSTEMS RESEARCH AND PLANNING DIVISION STUDIES OF NON-RECOVERABLE BOOST VEHICLES,
by J. R. Henry. 8 Apr 63, 26p. TDR169 3515 60TN1
Contract AF04 695 169
SSD TDR63 88
Unclassified report

Descriptors: *Launch vehicles (Aerospace), *Guided missiles (Surface-to-surface), *Booster rockets, Airframes, Structures Design, Tensile properties, Load distribution, Stresses, Analysis, Aerodynamic characteristics, Tests, Vibration, Acoustics, Fatigue (Mechanics), Thermal stresses, Structural parts, Military requirements.

This report contains a set of generalized structural criteria for the nonreusable boost vehicles of space launching systems and ballistic missile systems. Included are the basic objectives for the philosophy of structural design, a listing of the conditions and environments for which the vehicle must be investigated and designed, a summary of the requirements for establishing loads and other environmental factors for the design conditions and the requirements for establishing evidence of structural adequacy. (Author)

AD-405 149 Div. 27, 17
(TISTM/BRW) OTS price $3.60

Stanford Research Inst., Menlo Park, Calif.
TUNGSTEN AND ROCKET MOTORS.
Progress rept. no. 24, 1 Feb-30 Apr 63.
15 May 63, 31p.
Contract NOrd18619
Unclassified report

Descriptors: *Rocket motors, *Tungsten, Erosion, Thermal stresses, Shock resistance, Abrasives, Aluminum compounds, Oxides, Carbon dioxide, Carbon compounds, Monoxides, Exhaust gases, Mechanical properties.

AD-405 546 Div. 27, 12
(TISTA/GEC) OTS price $2.60

Hercules Powder Co., Bacchus, Utah.
TEST PLAN CUT-UP MOTOR SD-25.
Final rept.
25 May 63, 22p. MTO162 164
Contract AF04 647 243
Unclassified report

Report on Weapon System 133A.

Descriptors: *Rocket motors (Solid propellant), Test methods, Mechanical properties, Chemical analysis, Bonding, Research program administration, Cutting tools, Tests.

The purpose of this report is to present a logical means of dissecting and testing Minuteman third stage M-57E1 Rocket Motor samples. This test plan outlines the test objectives, motor cut-up sequences, sample machining procedures, chemical and physical testing requirements to be followed for motor cut-up SD-25. The prime objective of this test is the determination of case-bond strength and propellant physical properties. (Author)

28. PSYCHOLOGY AND HUMAN ENGINEERING

AD-404 866 Div. 28
(TISTB/AW) OTS price $1.60

Bureau of Naval Personnel, Washington, D. C.
ACCURACY OF AXIS ANGLE DIFFERENCE JUDGMENTS AI THE BOUNDARIES OF A PRESCRIBED CATEGORY SYSTEM,
by W. E. Cooley and E. G. Aiken. Dec 62, 11p.
NAVPERS TB62 19 Unclassified report

Descriptors: *Sonar targets, *Sonar personnel, Scanning sonar, Errors, Thresholds (Physiology) Perception, Classification, Effectiveness.

Students at the Fleet Anti-Submarine Warfare School were tested on their ability to make target axis angle difference judgments utilizing the angles at the boundaries of the Navy Electronics Laboratory category system as standard stimuli. It was found that about 50% of the judgments were corrected at about ± 4 to 5 degrees. In comparison to absolute angular categorization, the inclusion of a standard comparison stimulus considerably increased accuracy. (Author)

AD-404 913 Div. 28, 16
(TISTB/AW) OTS price $.75

Behavioral Sciences Lab., Aerospace Medical Div., Wright-Patterson Air Force Base, Ohio.
A BIBLIOGRAPHY OF THE EFFECTS OF TEMPERATURE ON HUMAN PERFORMANCE.
Final rept.,
by John Wing and Robert M. Touchstone. Feb 63, 19p.
Proj. 1710, Task 171002
AMRL TDR63 13 Unclassified report

Descriptors: *Bibliographies, *Stress (Physiology), *Stress (Psychology), Thresholds (Physiology), Reaction (Psychology), Reflexes, Psychomotor tests, Fatigue (Physiology), Industrial psychology, Temperature.

This bibliography lists technical reports and journal articles dealing with human performance under both high and low ambient temperatures. The articles and reports have been grouped into sections covering five major performance areas: (1) Sensory Thresholds and Simple Reaction Time, (2) Attention and Perception, (3) Psychomotor Performance, (4) Heavy or Prolonged Physical Work, and (5) Mental Performance. A sixth section of the bibliography lists references which review portions of the literature. All the references have been coded as to whether they deal primarily with the effects of high or low ambient temperatures. An author index is included. (Author)

AD-405 626 Div. 28
(TISTM/LMH) OTS price $6.60

Educational Testing Service, Princeton, N. J.
CORRELATES OF FACTORS IN IN-BASKET PERFORMANCE,
by Norman Frederiksen. Apr 63, 60p. RB63 12
Contract Nonr2338 00, Proj. NR151 182
Unclassified report

Descriptors: *Behavior, *Scientific personnel, Sociometrics, Projective techniques, Sociology, Test methods, Test construction (Psychology), Personality, Attitudes, Correlation techniques, Simulation, Selection.

Scores on tests of cognitive abilities, attitudes, interests, and personality and biographical information were obtained for a group of 115 administrators in the federal government who had also been given the Bureau of Business In-Basket Test. The group overlapped with a larger group of subjects who had provided data for a factor analysis of scores from the in-basket. The present study was to observe the correlations of in-basket scores with the ability and other measures and to estimate the factor loadings of the other measures on the factors obtained in the previous study. This was accomplished by estimating the correlations between in-basket scores and other variables for the larger group and then using a factor extension procedure to estimate loadings on the oblique primary factors and the second-order factors. Findings suggest that a response set toward social desirability is operating in one of the instruments and that scores on a social desirability scale under certain conditions might be useful in a predictor battery. The results tend to establish the construct validity of in-basket scores. (Author)

AD-405 684 Div. 28
(TISTM/LMH) OTS price $2.60

Texas Christian U., Fort Worth.
INFORMATION PROCESSES IN INTERPERSONAL RELATIONSHIPS,
by George J. Palmer, Jr. 21 Apr 63, 17p. TR7
Contract Nonr406700, Proj. NR170 478
Unclassified report

Descriptors: *Perception, Psychometrics, Learning, Projective techniques, Personality, Aptitude tests, Test methods, Group dynamics.

In trial studies of interpersonal relationships associated with interpersonal knowledge, real similarity, and the psychological structure of groups, each member of a group completed multiple-choice, objective questionnaires according to his best knowledge of each other member, and for himself in self-description. Analysis of interpersonal knowledge and similarity which were obtained for 36 3 to 7-man student teams in management gaming competition and for three, 8-patient psychotherapeutic groups in a mental hospital resulted in these conclusions. Interpersonal relationships identified in information and interpersonal learning are measurable processes of acquisition and relative interpersonal discrimination, which vary positively with duration of interaction and similarity, negatively with size of group, and differentially with class of information. (Author)

AD-405 739 Div. 28, 30
(TISTM/LMH) OTS price $1.60

Duke U., Durham, N. C.
A NERVE NET SYSTEM IN MODAL LOGIC,
by Kurt W. Back. 1963, 10p. TR9
Contract Nonr118111, Proj. NR177 740
Unclassified report

Descriptors: *Bionics, *Mathematical logic, Computer logic, Algebra, Automation, Networks, Simulation, Model tests, Computers, Theory.

The nerve nets or automata as developed in the theories of McCulloch and Shannon exhibit a two-valued extensional logic; i.e., Boolean algebra or a variation of it. The results of this mathematical and logical model are only applicable to a limited degree to the actual functioning of living organisms. Deductive logic is primarily designed to analyze and verify thought processes, not to represent them. Especially the assumed equality of all statements according to their truth value and the paradoxes of material implication hinder the applicability of the theory to living systems. Modal and intensional logic, with the introduction of the operators of possibility and necessity, the function of strict implication, and the assignment of several truth values approximates thought processes more closely. Thus a nerve net functioning according to modal logic would be a better model of a living system. Several systems were examined for representation in a nerve net and Prior's system Q was selected as the most appropriate. (Author)

AD-405 761 Div. 28
(TISTM/LMH) OTS price $3.60

Stanford U., Calif.
CORRELATION BETWEEN PEER RATINGS AND BEHAVIOR PATTERNS,
by Hans E. Lee and Lucy E. Burnham. 10 May 63, 38p. TR2
Contract Nonr225 62

Unclassified report

Report on Perception of Leadership in Small Groups.

Descriptors: *Leadership, *Sociometrics, Correlation techniques, Personnel, Selection, Analysis of variance, Professional personnel, Behavior, Statistical analysis, Performance tests.

Multiple correlation analyses were carried out with 44 variables, 43 of which were selected from scales of the Strong Vocational Interest Blank, the MMPI, the TAT, the Guilford-Zimmerman Temperament Survey, the Leadership Opinion Questionnaire, the Ghiselli Self-Description Inventory, the F Scale, and test of Personnel Problems, Practical Judgment, and Imaginary Events; grade point average was the other variable. The study was designed to assess whether or not these variables were related to the subject's being rated as desirable or as undesirable to have as a boss. 135 men who were candidates for the Masters in Business Administration degree were used as subjects. The best and only stable predictor of the number of times a student is rated by his peers as desirable to have as a boss is the grade point average earned in the two year MBA program. (Author)

29. QUARTERMASTER EQUIPMENT AND SUPPLIES

No Entries

30. RESEARCH AND RESEARCH EQUIPMENT

AD-404 701 Div. 30
(TISTP/WH) OTS price $5.60

System Development Corp., Santa Monica, Calif.
COMMAND SYSTEMS DEPARTMENT CRT OSCILLOSCOPE DISPLAY,
by C. F. Wills. 10 Apr 63, 55p. TM1166 224 00
Contract SD97

Unclassified report

Descriptors: *Cathode ray tubes, *Display systems, *Special purpose computers, Combat information centers.

An experimental display system to be used with the AN/FSQ-32 Computer is described. System requirements, design considerations and detailed logic design of the display buffer and associated components are discussed. Alignment and calibration procedures are furnished. (Author)

AD-404 702 Div. 30, 12
(TISTP/MFA) OTS price $1.10

System Development Corp., Santa Monica, Calif.
INFORMATION FOR COP USERS. USE OF IBMTTP WITH TAPE UNIT 3,
by W. E. Taber. 25 Mar 63, 1p. TM892 005 00
Contract AF19 628 1648

Unclassified report

Descriptors: *Programming (Computers), Satellite networks.

Information is provided concerning the usage and/or operation of the COPII (Control for Operational Programs) executive system. (Author)

AD-404 703 Div. 30, 12, 1
(TISTP/JEA) OTS price $1.60

System Development Corp., Santa Monica, Calif.
SAGE UNIQUE-TO-SITE ENVIRONMENTAL DATA AND EQUIPMENT ASSIGNMENTS, SIOUX CITY RCC/DC AND KANSAS CITY RCC,
by D. M. McDaniel. 22 Apr 63, 16p.
TM ADC820 290 00A
Contract AF19 628 1648

Unclassified report

Descriptors: *Programming (Computers), *Communication systems, Adaptive control systems, Data transmission systems, Automatic, Command and control systems, Air defense command.

AD-404 704 Div. 30, 12, 1
(TISTP/JEA) OTS price $1.60

System Development Corp., Santa Monica, Calif.
SAGE UNIQUE-TO-SITE ENVIRONMENTAL DATA AND EQUIPMENT ASSIGNMENTS, SAN FRANCISCO ADS,
by D. M. McDaniel. 22 Mar 63, 11p.
TM ADC820 282 00A
Contract AF19 628 1648

Unclassified report

Descriptors: *Communication systems, Adaptive control systems, Data transmission systems, Automatic, Magnetic recording systems, Command and control systems, Programming (Computers), Air defense command.

AD-404 705 Div. 30
(TISTP/FEM) OTS price $1.60

System Development Corp., Santa Monica, Calif.
1604 SIMULATION PROGRAM DESCRIPTIONS MILESTONE 11, SIMULATION DATA GENERATION CONTROL ROUTINE (SDGC),
by G. A. Madrid. 15 Mar 63, 8p. TM L734 026 00
Contract AF19 628 1648

Unclassified report

Descriptors: *Programming (Computers), Simulation, Control sequences, Input-output devices, Punched cards, Errors, Data processing systems, Magnetic tape, Satellite networks.

SDGC (Simulation Data Generation Control Routine) is used by the ordered execution of the data generation subroutines pre-scheduled by SIPSA, to update the system time counters, and to pack outputs from the executed subroutines in the formats requested. (Author)

AD-404 706 Div. 30
(TISTP/WH) OTS price $1.60

System Development Corp., Santa Monica, Calif.
SAGE UNIQUE-TO-SITE ENVIRONMENTAL DATA AND EQUIPMENT ASSIGNMENTS, RENO RCC/DC AND HAMILTON RCC,
by D. M. McDaniel. 22 Mar 63. 11p. TM ADC820 280 00A
Contract AF19 628 1648
Unclassified report

Descriptors: *Digital computers, *Programming (Computers), Antiaircraft defense systems.

Change pages for TM ADC820 280 00, SAGE Unique-to-Site Environmental Data and Equipment Assignments Reno RCC/DC and Hamilton RCC are presented. (Author)

AD-404 707 Div. 30
(TISTP/WH) OTS price $1.60

System Development Corp., Santa Monica, Calif.
SAGE UNIQUE-TO-SITE ENVIRONMENTAL DATA AND EQUIPMENT ASSIGNMENTS SPOKANE ADS,
by D. M. McDaniel. 22 Mar 63, 11p. TM ADC820 253 00A
Contract AF19 628 1648
Unclassified report

Descriptors: *Digital computers, *Programming (Computers), Air Defense Command, Antiaircraft defense systems.

Presents change pages for TM(ADC)-820/253/00, SAGE Unique-to-Site Environmental Data and Equipment Assignments. (Author)

AD-404 713 Div. 30
(TISTP/WH) OTS price $1.60

Systems Development Corp., Santa Monica, Calif.
UTILITY PROGRAM DESCRIPTION MILESTONE XI SUBROUTINE TIMER (SRTIMER),
by H. W. Houghton. 28 Mar 63, 11p. TM L715 037 00
Contract AF19 628 1648
Unclassified report

Descriptors: *Programming (Computers), *Digital computers, Satellite networks, Timing devices.

SRTIMER (Subroutine Timer) is a generalized routine for timing COP system programs. On the first entry to SRTIMER the speed of the computer is checked by doing a loop of known length. The constants used in the timing portion are adjusted to compensate for the difference of the individual computer from the 1604 specifications. A check is made to determine whether SRTIMER was loaded in an even or an odd location. (Author)

AD-404 715 Div. 30, 9
(TISTP/FR) OTS price $5.60

Boeing Scientific Research Labs., Seattle, Wash.
AN IBM 7090 PROGRAM FOR COMPUTING TWO-DIMENSIONAL AND AXIALLY-SYMMETRIC SUPERSONIC FLOW OF AN IDEAL GAS,
by F. Edward Ehlers. Nov 62, 49p. D1 82 0204
Unclassified report

Also available from the author.

Descriptors: *Supersonic flow, Axially-symmetric flow, Supersonic nozzles, Shock waves, Programming (Computers).

An IBM 7090 electronic computer program is given, by which it is possible to compute the axially-symmetric or two-dimensional Mach net for supersonic flows over pointed bodies with attached shocks, through channels consisting of two rigid walls, and through nozzles with an axis of symmetry. The computation of flows with free streamline boundaries is also possible, if no shocks occur within the flow. (Author)

AD-404 722 Div. 30
(TISTP/WH) OTS price $1.10

System Development Corp., Santa Monica, Calif.
MILESTONE 11 LOAD 5-LEVEL PAPER TAPE (SLOD5),
by R. C. Wise. 25 Apr 63, 7p. TM1003 012 00
Contract AF19 628 1648
Unclassified report

Descriptors: *Programming (Computers), *Punched tapes, *Computer storage devices, *Input-output devices, Satellite networks, Digital computers.

AD-404 723 Div. 30
(TISTM/LMH) OTS price $1.60

System Development Corp., Santa Monica, Calif.
PERSONNEL PLANNING INFORMATION FOR THE BIRD BUFFER OPERATOR,
by L. B. Alexander. 24 Apr 63, 12p. TM969 001 00
Contract AF19 628 1648
Unclassified report

Descriptors: *Job analysis, *Tracking, Computers, Operation, Radar tracking, Communication systems, Telemetering data, Labor, Personnel management, Maintenance personnel, Data processing systems.

AD-404 724 Div. 30
(TISTP/WH) OTS price $1.60

System Development Corp., Santa Monica, Calif.
OUTLINE AND BIBLIOGRAPHY FOR THE 4-WEEK Q-7 CODING COURSE,
by R. J. Gilinsky, K. R. Levy, M. E. Olson, and D. E. Reilly. 20 Mar 63, 10p. TM1118 002 00
Unclassified report

Descriptors: *Bibliographies, *Programming (Computers).

AD-404 740 Div. 30, 4
(TISTP/WH) OTS price $4.60

General Dynamics Astronautics, San Diego, Calif.
AUTOMATIC DATA PROCESSING OF WEATHER SATELLITE DATA,
by Walter A. Marggraf. 31 Jan 63, 50p. 63 0046
Contract AF19 604 8861, Proj. 6698, Task 669801
AFCRL TDR63 243 Unclassified report

Descriptors: *Meteorological satellites, *Data processing systems, *Telemeter systems, Photogrammetry, Photographic analysis, Clouds, Cloud cover, Instrumentation, Meteorological parameters, Digital systems.

The computer processes studied include ingestion of satellite pictorial data with digitization and digital pictorial display; data location, which includes rectification, automatic mosaicing, and mapping transformations; and data analysis, such as differentiation, slicing, and contouring of the data from pictorial intensity, and cloud amount determination. Data from TIROS III, Orbit 509 frames is used to demonstrate the techniques and results of rectification, mosaicing, and cloud cover amount determination. Also included are examples of reduced and full resolution digitized TIROS TV pictures. (Author)

AD-404 810 Div. 30, 9
(TISTP/MH) OTS price $2.75

Engineering Projects Lab., Mass. Inst. of Tech., Cambridge.
DESIGN CONSIDERATIONS AND METHODS FOR LOW-DENSITY WIND TUNNELS OPERATING WITH HIGH STAGNATION TEMPERATURES,
by G. A. Brown and A. E. Bergles. Apr 63, 136p.
Contract AF33 616 6582, Proj. 1426, Task 142603
ASD TDR63 154
Unclassified report

Report on Experimental Simulation of Flight Mechanics..

Descriptors: *Wind tunnels, Stagnation point, Temperature, Hypersonic flow, Boundary layer, Nozzles, Gas flow, Reynolds number, Drag, Hypersonic nozzles, Pressure, Compressible flow, Velocity, Distribution.

A study was made of design techniques for low-density wind tunnels operating with high stagnation temperatures and hypersonic flow. An approximate boundary layer analysis was developed to predict feasible ranges of operating conditions for low-density wind tunnels. Detailed calculations were made for three nozzles including boundary layer corrections for isentropic contours. (Author)

AD-404 815 Div. 30
(TISTP/FEM) OTS price $15.00

Air Force Special Weapons Center, Kirtland Air Force Base, N. Mex.
SPINNING UNGUIDED ROCKET TRAJECTORY DIGITAL COMPUTER PROGRAM (SPURT),
by Allen D. Dayton. Feb 63, 225p.
AFSWC TDR63 11
Unclassified report

Descriptors: *Programming (Computers), *Space probes, Control sequence, Digital computers, Computer logic, Atmosphere models, Integration, Matrix algebra, Gravity, Spin, Drag, Data, Data processing systems, Magnetic tape, Programming languages, Trajectories.

SPURT is a five-degree-of-freedom trajectory digital computer program for spinning unguided space probe vehicles. The program was written for the Control Data Corporation, 1604 digital computer. SPURT will compute trajectories for a vehicle up to a maximum of ten stages and has provision for computing the trajectories of the separated stages. This generalized program computes the trajectory over an oblate spheroidal, rotating Earth with atmosphere, in a geocentric rectangular coordinate system. All input and output data are in geodetic coordinates. Coasting flight trajectories are computed in two subroutines. The first is a Keplerian solution, which also computes orbital elements and ''look angles'' for various tracking stations. The second uses three-degree-of-freedom point mass equations solved by numerical integration. The program will prepare two special output tapes. One is used in plotting output data and the other is used to prepare a special tape for the Atlantic Missile Range. (Author)

AD-404 833 Div. 30, 8
(TISTE/CAM) OTS price $5.60

Motorola Inc., Scottsdale, Ariz.
EXTENSION OF ELECTRONIC EQUIPMENT LIFE PREDICTION STUDY.
Quarterly progress rept. no. 5, 15 Sep-15 Dec 62,
by A. T. Kneale, W. N. Simpson, and M. Esher.
Feb 63, 47p. WP2643 5
Contract DA36 039sc27235
Unclassified report

Descriptors: *Test sets, *Test equipment (Electronics), *Radio equipment, Operation, Time, Failure (Mechanics), Instrumentation, Measurement, Feasibility studies, Statistical analysis, Matrix algebra, Tables, Electronic equipment.

Effort is presented to prove the feasibility of providing field instrumentation capable of measuring the rate of degradation of performance in individual electronic devices. The major effort was expended in the following areas to: (1) develop a fresh approach to the prediction problem in order to develop a valid statistical class transition matrix V; (2) develop the programming procedure for periodically updating the embryonic transition matrix V; (3) study the possible ways in which eigenvalue solutions can be utilized in determining the entries in the unit modifier matrix V; and (4) make repetitive measurements on all the AN/PRC-6 radio sets at 20-hour operating intervals, under reduced voltage stress conditions, in order to determine whether greater accuracy can be obtained from the parametric measurements, and thus a more highly developed class transition matrix V and a more accurate prediction vector P. (Author)

AD-404 846 Div. 30
(TISTP/WH) OTS price $8.60

General Precision Lab., Inc., Pleasantville, N. Y.
UNIVERSAL PRINT READER.
Final rept.,
by A. K. Dietrich, K. W. Jenkner, J. F. Kripl, K. K. Maass and R. B. Greenly. Mar 63, 1v.
3 469
Contract AF30 602 2642
RADC TDR63 181 Unclassified report

Descriptors: *Reading machines, Optical equipment components, Photoelectric cells (Semiconductors), Handling, Paper, Documentation, Digital systems, Optical scanning, Optical equipment.

The objective of this program was to determine the potential capabilities of the Link Reading Technique toward fulfilling the requirements of a reading machine which could be appropriately referred to as 'A Universal Print Reader.' Emphasis was placed on development of paper-handling capability as well as multi-font recognition, since commercially available equipment in both areas falls far short of 'universal' status. Results indicated that reliable multifont recognition can be realized and compatible paper handling mechanisms can be made which are tolerant of a reasonable amount of input document degradation such as is common with field-prepared documents. This report contains a detailed description of the operating principles of a complete page reading system, along with a number of techniques for extending the performance of this machine. (Author)

AD-404 907 Div. 30, 8
(TISTP/MH) OTS price $12.50

Technical Military Planning Operation, General Electric Company, Santa Barbara, Calif.
THREE-DIMENSIONAL RAY TRACE COMPUTER PROGRAM

FOR ELECTROMAGNETIC WAVE PROPAGATION STUDIES,
by Walter F. Dudziak. 1 May 61, 170p. RM61 TMP32
Contract DA49 146XZ038
DASA 1232

Unclassified report

Descriptors: *Programming (Computers), Electromagnetive wave reflections, Refraction, Data processing systems, Radio transmitters, Differential equations, Optics, Earth, Magnetic fields, Snell's law.

A computer program is described for use on the IBM-704/7090 electronic data processing machine or any large computer accepting FORTRAN. The necessary modifications for use on these two computers are simple and self-evident. The computer program permits the computation of detailed ray patterns portraying the spatial distribution of rays emitted from a transmitter whose geographic coordinates with respect to the center of the earth are known. This program deals with the solution of the differential equations, given by Hamiltonian optics, for ray paths in non-isotropic, three-dimensionally non-homogeneous media whose complex phase refractive index is given by the Appleton-Hartree formula. An account of the current status of the development of this program, which has yielded many useful results is presented. Sample calculations as well as some results that were obtained by using this program are also presented. (Author)

AD-405 058 Div. 30
(TISTE/VWS) OTS price $1.10

Inter-Range Instrumentation Group, White Sands Missile Range, N. Mex.
CRITERIA FOR STANDARD OSCILLOGRAPHIC DATA DISPLAY FORMAT.
1963, 3p.
IRIG 101 63 Unclassified report

Descriptors: *Oscillographs, Electric currents, Pressure, Temperature, Fluid flow, Roll, Yaw, Gain, Attenuation, Pitch, Galvanometers, Standards.

AD-405 128 Div. 30, 25
(TISTP/WH) OTS price $1.10

System Development Corp., Santa Monica, Calif.
GENERAL PURPOSE SATELLITE COMPUTER PROGRAM DESCRIPTIONS MILESTONE XI CORRECTION APPARENT ELEVATION FOR REFRACTION (RC),
by Nancy Speer. 9 Nov 62, 7p. TM14 032 00
Contract AF04 695 40

Unclassified report

Descriptors: *Refraction, *Programming (Computers), *Satellites (Artificial), Position finding, Correction, Tracking.

RC (Correct Apparent Elevation for Refraction) corrects for refraction any number of elevations which are within the range 0 to 2 pi. (Author)

AD-405 129 Div. 30
(TISTP/WH) OTS price $1.10

System Development Corp., Santa Monica, Calif.
SCF COMPUTER PROGRAM SYSTEMS MANUAL UTILITY PROGRAMS INTRODUCTION AND TABLE OF CONTENTS,
by C. L. Hill. 22 Apr 63, 2p. TM705 000 00C
Contract AF19 628 1648

Unclassified report

Descriptors: *Programming (Computers) *Instruction manuals.

AD-405 130 Div. 30, 12
(TISTP/MB) OTS price $3.60

System Development Corp., Santa Monica, Calif.
MILESTONE 11 160A COMPUTER PROGRAM DESCRIPTION,
by V. J. Gergen. 26 Mar 63, 30p. TM1003 010 00
Contract AF19 628 1648

Unclassified report

Descriptors: *Programming (Computers), Satellite networks, Tracking, Simulation.

The CCC Simulator provides a simulated intercommunication link between the Bird Buffer (BB) computer and the Tracking Station (TS) computer that is normally performed by the Computer Communication Converter (CCC) and associated equipment. (Author)

AD-405 132 Div. 30
(TISTP/WH) OTS price $3.60

System Development Corp., Santa Monica, Calif.
1604 SIMULATION PROGRAM DESCRIPTIONS MILESTONE 11. THE SIMULATED TELEMETRY DATA GENERATION CONTROL PROGRAM (STGR),
by J. Ng. 15 Mar 63, 31p. TM L734 024 00
Contract AF19 628 1648

Unclassified report

Descriptors: *Simulation, *Telemetering data, *Programming (Computers).

The Simulated Telemetry Data Generation Control Program (STGR) has been designed to provide realistic telemetry data (Fixed Format and Event Items) under card input control. The simulated data will be packed in the same format as the Telemetry Report Message (Message Type #13). In the present version, only the FM/FM telemetry data is simulated. Additional capability to simulate PAM and PCM telemetry data (exclusive of special vehicle-specific payload telemetry) will be incorporated (if desirable) at a future date, when adequate information is available. (Author)

AD-405 13[illegible] Div. 30
(TISTP/WH) OTS price $4.60

System Development Corp., Santa Monica, Calif.
1604 SIMULATION PROGRAM DESCRIPTIONS MILESTONE 11. DATA REDUCTION AND OUTPUT PROCESSING SYSTEM CONTROL PROGRAM FOR AUGMENTATION (DROPSA),
by J. G. Hillhouse. 15 Mar 63, 44p.
TM L734 017 00
Contract AF19 628 1648

Unclassified report

Descriptors: *Programming (Computers), *Data processing systems, Simulation, Punched cards.

DROPSA (Data Reduction and Output Processing System Control Program for Augmentation) is used to reduce data on the two simulated data input tapes written by the SIPSA (Simulated Input Preparation System for Augmentation) system and the recording tape produced by SIMSTN (Augmented Tracking Station Simulation Program). (Author)

AD-405 158 Div. 30
(TISTP/MC) OTS price $10.50

Chance Vought Corp., Dallas, Tex.
STATIC STABILITY TESTS ON A 0.098 SCALE STANDARD LAUNCH VEHICLE (SLV)-1B WITH 4-SQUARE-FOOT FIN AREA,
by C. E. Ziegler. Feb 63, 132p.
Contract AF29 601 5603, Proj. 620 850B7043
AFSWC TDR63 21 Unclassified report

Descriptors: *Spacecraft, *Launch vehicles (Aerospace), Fins, Instrumentation, Strain gages, Pressure, Transducers, Wind tunnels, Model tests.

The purpose of the tests performed in the high-speed wind tunnel was to obtain force data to evaluate the static stability characteristics of the SLV-1B with 4-square-foot fins. The model was instrumented with a six-component internal strain gage balance and two base pressure probes to determine the forces on the model. The model was then placed in the tunnel and tested in the Mach number range of 0.6 through 5.0, and a Reynolds number range of 6 million/ft. to 20 million/ft. The model attitude was varied from -10 to +10 degrees in the pitch plane. The results obtained were force and moment data in the body axes; these results are presented in tabulated form with selected coefficients presented in plotted form. (Author)

AD-405 473 Div. 30, 15
(TISTP/FEM) OTS price $3.60

RAND Corp., Santa Monica, Calif.
IMPROVING THE QUANTIZATION OF RANDOM SIGNALS BY DITHERING,
by G. G. Furman. May 63, 35p.
Contract AF49 638 700
RAND RM3504 PR
Unclassified report

Descriptors: *Digital systems, *Analog systems, Analog-digital computers, Low-pass filters, Band-pass filters, Linear systems, Nonlinear systems, Integrals, Equations, Noise, Data processing systems, Control systems.

A numerical solution to the practical problem of determining the effects of independent quantizer activators called dithers upon the statistical processing properties of the quantizer is presented. For the highly important sinusoidal and sawtooth dithers exact analysis yields for the first time answers, as functions of dither amplitude, to the question of what upper bounds does the dither impose on the following: (1) correlation between the quantizer input and quantization noise, (2) value of the noise mean square, and (3) fidelity in the transmission of the mean square, mean fourth and other even moments of the input. The above information, which also comprises a theorem for the quantization of sinusoids and sawtooths, indicates that the rarely used sawtooth is superior to the sinusoid. (Author)

AD-405 587 Div. 30, 15
(TISTP/FEM) OTS price $2.60

Air Force Special Weapons Center, Kirtland Air Force Base, N. Mex.
THE PRODUCTION OF RANDOMLY DISTORTED AND DETERIORATED PATTERNS,
by Richard E. Manelis. 11 Apr 63, 23p.
AFSWC TDR63 44 Unclassified report

Descriptors: *Programming (Computers), *Pattern recognition, Data, Degradation, Distortion, Numbers, Identification, Computers, Data processing systems, Computer storage devices, Coding.

A set of computer subroutines which attempt to simulate various degrees of distortion and deterioration on an input character is developed. A complete set of the letters of the Cyrillic alphabet, numerals, and some punctuation were quantized and punched to be used as ideal input characters to transforming subroutines. These transforming subroutines permit the generation of large sample sets of characters containing controlled amounts of various types of distortion. Use of the routines will produce a set of test characters in which the pattern size, percentage distortion (or amount of shift), and number of output samples desired are parameters. The output of any of the programs developed can be used as the input to a character recognition routine. It is the object of this study to produce a variety of source pattern representations of the same pattern. The use of these programs is demonstrated in conjunction with a recognition routine. (Author)

AD-405 614 Div. 30, 18
(TISTP/FEM) OTS price $3.60

Aeronautical Systems Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PLANNING CONCEPTS FOR ASD INFORMATION/DECISION SYSTEMS,
by F. W. Clark. Jan 63, 20p.
ASD PN ASOP63 1
Unclassified report

Descriptors: *Management engineering, *Decision making, Cybernetics, Computer storage devices, Input-output devices, Magnetic tape, Digital computers, Compatibility, Display systems, Air Force Systems Command, Computers, Data processing systems.

A foundation for the planning effort needed to furnish ASD with a management system which takes fullest advantage of the best tools available is presented. Thirteen categories of concepts pertaining to the ASD decision system in the 1965-75 time period are identified. Each category is described and the ASD concept stated in terms broad enough to retain validity for an extended period of time, yet in sufficient detail to provide a preliminary basis for describing or measuring progress toward the attainment of an adequate information/decision systems. (Author)

AD-405 697 Div. 30, 32
(TISTM/DGH) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE PHILOSOPHICAL QUESTIONS OF CYBERNETICS,
by B. F. Semkov. 8 May 63, 10p.
FTD TT63 368
Unclassified report

Trans. from Russian Periodical, Vestnik Akademiy Nauk SSSR, No. 9, pp. 128-131, 1962.

Descriptors: *Cybernetics, Reasoning (Psychology), Attitudes, Symposia.

AD-405 718 Div. 30
(TISTP/JEA) OTS price $6.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
SOME METHODS FOR INCREASING THE RATE OF CALCULATION OF ELEMENTARY FUNCTIONS ON DIGITAL ELECTRONIC COMPUTERS (Nekotoryye Puti Povysheniya Skorosti Vychisleniya Elementarnykh Funktsiy na Tsifrovykh Elektronnykh Vychislitel'nykh Mashinakh),
by Yu. A. Golubkov and A. B. Lebedev. 22 Apr 63, 60p.
FTD TT62 1862 Unclassified report

Trans. from Elektronnyye Vychislitel'nyye Mashiny, Moskva, pp. 1-64, 1962.

Descriptors: *Digital computers, *Numerical methods and procedures, Computer logic, Control systems, Data processing systems, Numerical analysis, Polynomials, Time, Reduction, Functions, Computer storage devices, Mathematical logic, Digital systems.

Algorithms for table-polynomial approximation of elementary functions on digital computers are discussed. At the expense of a certain increase in the number of computer memory cells occupied with sub-routines for calculating elementary functions, these methods permit a significant increase in the rate of calculation of these functions. (Author)

AD-405 762 Div. 30
(TISTP/JW) OTS price $6.60

System Development Corp., Santa Monica, Calif.
UTILITY PROGRAM DESCRIPTIONS MILESTONE 11. DATA REDUCTION PROGRAM FOR THE PARAMETER TEST SYSTEM (SDRP),
by Regina Frey. 22 Apr 63, 62p. TM715 040 00
Contract AF19 628 1648
Unclassified report

Descriptors: *Programming (Computer), Satellites (Artificial), Networks, Input-output devices, Data processing systems.

Reports that SDRP is the data reduction program for the Parameter Test System. States that its purpose is to format and list on a BCD tape, or on the on-line printer, the data from the recording tape generated by the Test Control Program, STCP. Also states that all records on the tape may be listed, or records may be selected for listing through the use of Selective Listing Input Messages. (Author)

AD-405 774 Div. 30, 6
(TISTP/JW) OTS price $3.60

System Development Corp., Santa Monica, Calif.
1604 SIMULATION PROGRAM DESCRIPTIONS: MILESTONE 11. SIMULATED TRACKING DATA GENERATION ROUTINE (SRGR),
by P. T. Kastama. 15 Mar 63, 29p. TM L734 023 00
Contract AF19 628 1648
Unclassified report

Descriptors: *Programming (Computers), *Tracking, Simulation, Satellite networks.

A program is reported that generates realistic tracking data, based on pre-determined orbital conditions from a Reset Tape, for augmented tracking stations. This forms the data into tracking messages, which are then written on either a Bird Buffer or BB-1604 Transfer Tape by the SIPSA (Simulated Input Preparation System for Augmentation) program. It is also reported that SRGR will punch tracking messages on paper for the Indian Ocean Station. (Author)

AD-405 787 Div. 30, 12
(TISTP/JEA) OTS price $1.60

System Development Corp., Santa Monica, Calif.
INFORMATION FOR COP USERS: NOTES OF COPII,
by B. R. Pruett. 16 Apr 63, 12p. TM892 006 00
Contract AF19 628 1648
Unclassified report

Descriptors: *Space surveillance systems, *Satellite networks, *Programming (Computers), Magnetic tapes, Punched cards, Input-output devices, Computer storage devices, Magnetic cores, Computer logic.

Restrictions imposed upon the usage of the COPII control program (MTCII) are clarified and a few debugging techniques are recommended. (Author)

AD-405 788 Div. 30
(TISTP/JP) OTS price $1.10

System Development Corp., Santa Monica, Calif.
1604 SIMULATION PROGRAM DESCRIPTIONS. MILESTONE 11. OCTAL DUMP FOR SIMULATION AUGMENTATION MESSAGES (SOCT),
by J. D. Solomon. 15 Mar 63, 7p. TM L734 020 00
Contract AF19 628 1648
Unclassified report

Descriptors: *Programming (Computers), *Digital computers, Satellite networks, Simulation.

A routine is given to output messages which have been previously generated and recorded on magnetic tape by the SIPSA system, or recorded by the SIMSTN program. (Author)

AD-405 850 Div. 30
(TISTP/MFA) OTS price $1.10

Air Force Technical Applications Center, Washington, D. C.
A DIGITAL MAGNETIC TAPE FORMAT FOR VELA-UNIFORM,
by Ben S. Melton. 1 Apr 63, 8p.
AFTAC TR VU63 1 Unclassified report

Project VELA-UNIFORM.

Descriptors: *Programming (Computers), *Magnetic tape, Analog-to-digital converters, Seismographs, Sequences, Data storage systems, Digital computers, Analog-digital computers.

31. SHIPS AND MARINE EQUIPMENT

AD-405 558 Div. 31, 7, 8
(TISTE/OHD) OTS price $2.60

ITT-Surprenant Mfg. Co., Clinton, Mass.
DEVELOPMENT AND CONSTRUCTION OF WATERTIGHT CABLES RG 11 A/U RG 217/U RG 218/U.
Interim evelopment rept., 28 Jan-25 Apr 63.
25 Apr 63, 21p.
Contract NObsr87574, Proj. SR008 80 303, Task 9634
Unclassified report

Descriptors: *Coaxial cables, Electric wire, Electric cables, Electric insulation, Manufacturing methods, Isocyanate plastics, Synthetic rubber, High-pressure research, Electrical properties, Deformation, Moistureproofing.

The main objectives are as follows: (a) Attenuation - Very low losses have been achieved with the cables as now fabricated. (b) Flexibility - The standards set up in the pertinent specification have been met, but this is one area where an improvement could be attained. (c) Hydrostatic - All cables have gone to 1000 PSI with 0 leakage over the specified time. (d) Mechanical Ability - All cables have passed this 1000 cycles abrasion as set up in MIL-C-915 with a great deal of margin. (e) All cables have met the capacitance and impedance requirements. (Author)

AD-405 623 Div. 31
(TISTE/CAM) OTS price $2.60

Continental Carbon, Inc., Cleveland, Ohio.
IMPACT REDUCTION METHOD FOR SIDE LAUNCHING PON-

TOON STRUCTURES - INFLATABLE CUSHION,
by J. V. Stalcup. 22 Mar 63, 20p.
Proj. YF015 11 322
NCEL TN489 Unclassified report

Descriptors: *Floats, *Inflatable structures, Fiber board, Landing impact, Reduction, Recovery, Storage, Test equipment, Test methods, Launching.

When pontoon structures are side-launched from LST's, the high impacts cause damage to the structures that results in excessive maintenance and replacement costs. An expendable fibre board cushion was previously designed; procedures for assembling and attaching it were developed. Impacts and apparent damage to the pontoon structure were reduced to acceptable levels with the fibre board cushions. For reasons of economy the investigation was continued into the use of reusable inflatable cushion materials. These were found to be less effective, and are also undesirable and impractical for reasons of handling. Use of the inflatable units for impact reduction is not recommended. (Author)

AD-405 891 Div. 31
(TISTE/CAM) OTS price $4.60

Netherlands Ship Model Basin.
RESEARCH ON THE NOZZLE + SCREW PROPELLER (DUCTED PROPELLERS).
Final technical rept., 1 Jan 61-31 Oct 62.
31 Oct 62, 44p. CTR535
Contract DA91 591EUC1659
Unclassified report

Descriptors: *Propellers (Marine), *Nozzles, Model tests, Hydrophones, Cavitation, Cavitation noise, Effectiveness, Measurement, Water, Tables, Screws.

Research was continued on the nozzle + screw propeller. Open water tests and cavitation tests were carried out in order to investigate the influence of the propeller load at the tip and the clearance between blade tip and nozzle on efficiency, cavitation and noise. (Author)

32. MISCELLANEOUS ARTS AND SCIENCES

AD-404 908 Div. 32, 16, 10
(TISTM/CCH) OTS price $1.10

Aerospace Information Div., Washington, D. C.
HYDROCARBON-OXIDIZING AND SULFATE-REDUCING BACTERIA. COMPILATION OF ABSTRACTS.
10 May 63, 3p. 23
AID P63 59 Unclassified report

Descriptors: *Abstracts, *Bacteria, Sulfates, Sulfur compounds, Hydrocarbons, Jet engine fuels, Inhibition, Antibiotics, Contamination, Decontamination, Fuel tanks, Oxidation-reduction reactions, Bacteria, Abstracts.

AD-405 561 Div. 32, 30
(TISTP/FEM) OTS price $2.60

RAND Corp., Santa Monica, Calif.
THE POSITION OF PREPOSITIONAL PHRASES IN RUSSIAN,
by Kenneth E. Harper. May 63, 17p.
Contract AF49 638 700
RAND RM3625PR Unclassified report

Descriptors: *Machine translation, *Textbooks, Automation, Computers, Magnetic tape, Automatic, Errors, Probability, Programming (Computers).

A problem frequently encountered in the automatic parsing of Russian texts is the correct structuring of prepositional phrases in sentences. Studies of text samples indicate that, when other criteria are absent, the syntactic governors of prepositions can be determined with a high degree of accuracy by reference to the relative position and part-of-speech of elements in the clausal environment. (Author)

AD-405 565 Div. 32
(TISTM/LMH) OTS price $2.60

RAND Corp., Santa Monica, Calif.
SOVIET PHILOSOPHY, SCIENCE AND CYBERNETICS,
by F. J. Krieger. May 63, 21p.
Contract AF49 638 700
RAND RM3619 PR Unclassified report

Descriptors: *Communism, *Economics, Theory, Industrial research, Sociology, History.

Marxist-Leninist ideology is founded on a doctrinal edifice that consists of two parts: dialectical materialism and historical materialism. Dialectical materialism is both a theory of reality, or world-outlook, and a methodology; it is allegedly based on the evolution of the natural sciences and affirms the continuous transformation of matter and the dynamic interconnectedness of things and concepts. Historical materialism is the associated theory of society and deals with the problems of ethics, aesthetics, and the philosophies of history and law. That Marxism-Leninism is not a science follows from the fact that it does not satisfy the three essential conditions of a science: (1) that it be based on experience; (2) that it be presented in a logical and coherent way; (3) that it be open to free criticism and readjustment or rejection if further facts demand it. Marxism-Leninism does not satisfy any of these conditions. It is not based on experience; rather, it is proposed as an priori dogma derived from the inviolable ''classics'' of Marx, Engels, and Lenin. It is not logically organized. It rejects free criticism and believes itself to be eternal and unchanging. (Author)

AD-405 566 Div. 32
(TISTM/LMH) OTS price $1.60

Miami U., Coral Gables, Fla.
THE INCENTIVE VALUE OF SOCIAL APPROVAL AND BEHAVIOR IN SMALL GROUPS,
by Michael B. Lupfer and John W. McDavid.
Apr 63, 8p. TR4
Contract Nonr84022
Unclassified report

Descriptors: *Personnel management, Sociology, Motivation, Emotions, Behavior, Effectiveness, Sex, Stimulation, Reactions (Psychology).

In order to explore the relationship between approval-seeking motivation and individual patterns of behavior in small groups, a measure of the incentive value of interpersonal approval and disapproval for an individual was correlated with observations of behavior in four-man discussion groups. Interaction Process Analysis was employed in categorizing observed behavior as (A) positive social-emotional acts, (B) information-giving, (C) information-seeking, or (D) negative

social-emotional acts. Approval-seeking motivation was found to be unrelated to either category of social-emotional (''maintenance function'') behavior, but was correlated negatively with information-giving and positively with information-seeking for females, though not for males. For females, approval-seeking motivation was correlated negatively with an index of tendency to be active and directing, as opposed to passive and submissive, in task-related activity. (Author)

AD-405 689 Div. 32
(TISTM/LMH) OTS price $2.60

RAND Corp., Santa Monica, Calif.
AN APPROACH TO THE STUDY OF A DEVELOPING ECONOMY BY OPERATIONAL GAMING,
by Olaf Helmer and E. S. Quade. Mar 63, 23p.
P2718

Unclassified report

Paper was prepared for the Symposium on the Possibilities of Operations Research in Developing Countries, June 26-28, 1963, Paris.

Descriptors: *Operations research, *Game theory, Economics, United States government, Factor analysis, Simulation.

The possible use of operational gaming, or simulation involving human players, to examine an economy as a whole is considered. It is believed that this operations research technique could become an extremely useful tool for the study of a developing economy. In the present state of the art it is not going to provide, with confidence, direct recommendations on what to do about matters of national policy. Rather it is an educational device, providing both ideas and insights, useful for the generation and preliminary comparison of alternative economic policies. (Author)

AD-405 721 Div. 32
(TISTM/DGH) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PEOPLE OF RARE PROFESSIONS - PILOTS (NAVIGATORS) OF COSMONAUTS,
by V. Belikov. 26 Apr 63, 5p.
FTD TT63 419

Unclassified report

Trans. from Izvestiya, No. 59, p. 6, 10 March 63.

Descriptors: *Astronauts, Education, Reasoning, Training.

33. TRANSPORTATION

No Entries

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

*Descriptors marked with an asterisk are included in the subject index.

BIBLIOGRAPHY

TID-4025(Rev. 1) (Pt. I) (Suppl. 1) OTS $4.00

Atomic Energy Commission. Div. of Technical Information Extension, Oak Ridge, Tenn.
TRANSLATION TITLE LIST AND CROSS REFERENCE GUIDE, ed. by Frances E. Stratton, 305p.

NASA N63-13931 OTS $2.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
JPL BIBLIOGRAPHY NO. 39-4. PRERELEASE NO. 1, JULY 1 THROUGH JULY 31, 1962. Rept. on Contract NAS7-100. 8 Aug 62, 24p. 21 refs.

ORNL-3300(Vol. 2) OTS $3.50

Oak Ridge National Lab., Tenn.
PUBLICATIONS, REPORTS, AND PAPERS FOR 1962 FROM OAK RIDGE NATIONAL LABORATORY, ed. by K. O. Johnsson and Ann S. Klein. Rept. on Contract W7405-eng-26. 1963. 248p.

AGRICULTURE

Plant Cultivation

TID-17552 OTS $2.60

Pennsylvania State U., University Park.
THE INHERITANCE AND CHARACTERISTICS OF DIFFERENTIAL ELEMENT ACCUMULATION BY MAIZE WITH PARTICULAR EMPHASIS ON STRONTIUM AND CALCIUM. Annual progress rept. on Contract AT(30-1)2744. Nov 62, 26p.

TID-17421 OTS $1.60

Texas Agricultural Experiment Station, College Station.
RADIOCHEMICAL STUDIES WITH ETHYLENE IN PLANT METABOLISM, by Wayne C. Hall. Final research rept. on Contract AT(40-1)2456, 25 Oct 62, 17p.

ASTRONOMY

PB 181 522 OTS $3.50

Bureau of Ships, Washington, D. C.
NATURAL ILLUMINATION CHARTS, by Dayton R. E. Brown. Sep 52, declassified. 226p. 3 refs. Rept. no. 374-1.
Also available from LC mi$3.60, ph$9.30 as PB 143 300

DESCRIPTORS: *Illumination, *Graphic analysis, *Solar radiation, *Night sky, Sky brightness, Moon, Clouds, Time, Military operations.

It is the purpose of these charts to provide the Armed Forces with convenient and rapid access to the latest scientific information available on natural illumination. For clear days and clear moonless nights, the illumination in foot-candles falling on a fully exposed horizontal plane at any point on the earth, at any day of the year, and at any hour of the day or night, can be found quickly and simply. This information is of prime importance in answering questions relating to reconnaissance, visibility, concealment, and other naval and military problems.

Astrophysics

NASA N63-15321 OTS $3.60

Armour Research Foundation, Chicago, Ill.
RADIATIVE ENERGY TRANSFER ON ENTRY INTO MARS AND VENUS, by William O. Davis. Quarterly rept. no. 4 on Contract NASr-65(01). Mar 63, 38p. 16 refs. ARF-A200-4.

NASA N63-14253 OTS $2.60

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
POSSIBLE CONTRIBUTIONS OF SPACE EXPERIMENTS TO COMETARY PHYSICS, by P. Swings. Rept. on NASA Grant NsG-87-60. 15 Dec 62, 24p. 20 refs. SAO Special Rept.-111.

NASA N63-13991 OTS $6.60

Enrico Fermi Inst. for Nuclear Studies, U. of Chicago, Ill.
KINEMATICAL HYDROMAGNETIC THEORY AND ITS APPLICATION TO THE LOW SOLAR PHOTOSPHERE, by E. N. Parker. Rept. on Grant NsG-96-60. Jan 63, 69p. 34 refs. EFINS-63-1.

NASA N63-17319 OTS $13.00

Geophysics Corp. of America, Bedford, Mass.
LABORATORY AND THEORETICAL STUDIES IN THE VACUUM ULTRAVIOLET, by F. F. Marmo. Final rept., 2 Feb 62-2 Mar 63, on NASA Contract NASw-395 Apr 63, 182p. refs. GCA-TR-63-12-N; NASA CR-50201.

NASA N63-14678 OTS $1.10

Geophysics Corp. of America, Bedford, Mass.
A STUDY OF THE METEOROLOGY OF MARS AND VENUS, by G. Ohring, O. Cote, and W. Tang. Quarterly progress rept. no. 3, 6 Apr-5 July 62, on Contract NASw-286. 1962, 9p. 2 refs.

NASA N63-17105 OTS $3.50

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
GODDARD SPACE FLIGHT CENTER CONTRIBUTIONS TO THE COSPAR MEETING, MAY 1962. May 63, 231p. 320 refs. Technical note D-1669; includes NASA N63(17106-17115)

NASA N63-16985 OTS $0.50

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
THE LONG-PERIOD MOTION OF THE TROJANS, WITH SPECIAL ATTENTION TO THE THEORY OF THUERING, by Karl Stumpff. June 63, 17p. 7 refs. NASA TN D-1416.

NASA N63-16575 OTS $1.00

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
ON A MODIFICATION OF HANSEN'S LUNAR THEORY, by Peter Musen. June 63, 33p. 9 refs. Technical note no. D-1745.

NASA N63-14984 OTS $3.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
UTILIZATION OF EXTRATERRESTRIAL RESOURCES. Seminar proceedings presented at the meeting of the Working Group on Extraterrestrial Resources, Washington, D. C., 25-26, Sep 62. Astronautics Information on Contract NAS7-100. 1 Apr 63, 38p. 28 refs. Includes NASA N63-(14985-14991).

NASA N63-15077 OTS $6.60

Lunar and Planetary Lab., U. of Arizona, Tucson.
COMMUNICATIONS OF THE LUNAR AND PLANETARY LABORATORY, VOLUME I, NUMBERS 17-23, by Gerard P. Kuiper and Alika K. Herring. Report on NASA Grant NsG-161-61. 1962, 68p. 147 refs. Includes NASA N63-(15078-15084)

NASA N63-15421 OTS $0.50

Marshall Space Flight Center, National Aeronautics and Space Administration, Huntsville, Ala.
PERIODIC SOLUTIONS OF THE RESTRICTED THREE BODY PROBLEM REPRESENTING ANALYTIC CONTINUATIONS OF KEPLERIAN ELLIPTIC MOTIONS, by Richard F. Arenstorf. May 63, 18p. 10 refs. Technical note D-1859.

NASA N63-16292 OTS $0.50

National Aeronautics and Space Administration, Washington, D. C.
THE EFFECT OF REFRACTION ON THE SETTING SUN AS SEEN FROM SPACE IN THEORY AND OBSERVATION, by Winifred S. Cameron, John H. Glenn and others. May 63, 10p. 3 refs. Technical note D-1721.

NASA N63-17208 OTS $1.25

Rensselaer Polytechnic Inst., Troy, N. Y.
PHOTOCHEMICAL PROBLEMS OF THE VENUS ATMOSPHERE, by Paul Harteck, Robert R. Reeves, Jr. and Barbara A. Thompson. Rept. on NASA Grant NsG-261-62. June 63, 42p. 46 refs. NASA TN D-1984.

NASA N63-14231 OTS $2.60

Space Sciences Lab., U. of California, Berkeley.
INTERPLANETARY GAS. VIII. ON THE ROLE OF RADIATION LOSSES, by Peter Bodenheimer, John C. Brandt, and R. R. Robbins. Rept. on Grants NsG-243-62 and Nonr (G)-00051-62. 1963, 27p. 36 refs. Series 4, issue 7.

NASA N63-16229 OTS $16.00

Space Technology Labs., Inc., Redondo Beach, Calif.
COMET INTERCEPT STUDY. Final rept. on NASA Contract NASw-414. 28 Mar 63, 250p. 61 refs. Rept. no. 8668-6002-RU-000.

BEHAVIORAL SCIENCES

Human Engineering

NASA N63-15776 OTS $2.25

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
EVALUATION OF A TECHNIQUE FOR DETERMINING TIME-INVARIANT AND TIME-VARIANT DYNAMIC CHARACTERISTICS OF HUMAN PILOTS, by Jerome I. Elkind, Edward A. Starr, and others. Report on NASA Contract NASw-185. May 63, 86p. 38 refs. NASA Technical note D-1897.

PB 163 052 OTS $7.60

Human Engineering Labs., Aberdeen Proving Ground, Md.
MILESTONES. A DIRECTORY OF HUMAN ENGINEERING LABORATORIES PUBLICATIONS, 1953-1962, by Donna M. Warren, Dec 62, 71p.

DESCRIPTORS: *Human engineering, *Directories, Documentation, Perception, Motor reactions, Ecology, Sensory mechanisms, Ordnance, *Bibliographies

Psychology

AD-284 604 OTS $1.10

New York U., N. Y.
A FAILURE TO FIND EFFECTS OF FUNCTION WORDS ON SERIAL POSITION CURVES IN FREE RECALL OF A RANDOMLY SELECTED LIST OF WORDS, by Charles N. Cofer. Technical rept. no. 3 on Learning, Retention, and Recovery of Meaningful Material, Contract Nonr-285(47). July 62, 9p. 4 refs.

DESCRIPTORS: *Memory, *Vocabulary, Distribution, Selection.

A 30 word, zero-order approximation to the English language was presented a single time to different groups of Ss, with a request for free recall. To one of the groups only the 30 words were presented; to the other seven groups function words were inserted at from one to nine places in the passage. All eight groups yielded essentially identical serial position curves for recall, the curves resembling the classical bow-shaped curve of serial anticipation learning. Under the conditions of this experiment, no effects of function words on recall were found.

AD-284 605 OTS $1.10

New York U., N. Y.
GENERATION OF LIST ITEMS WITHOUT LIST PRESENTATION AS A FUNCTION OF INTER-ITEM ASSOCIATIVE STRENGTH, by Charles N. Cofer. Technical rept. no. 9 on Learning, Retention and Recovery of Meaningful Materials, Contract Nonr-285(47). July 62, 8p. 3 refs.

DESCRIPTORS: *Memory, *Vocabulary, Distribution, Selection.

The most important finding in this experiment is the indication that, under the conditions of this experiment, associates to the sample items and the list name are used substantially more often than they are immediately following actual list presentation.

HW-SA-2820 OTS $1.10

Hanford Atomic Products Operation, Richland, Wash.
CARE AND MANAGEMENT OF LABORATORY RESEARCH DOGS, by James F. Park. Rept. on Contract AT(45-1)-1350. 31 Oct 62, 5p.

NASA N63-15707 OTS $1.60

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
SPACECRAFT LIFE SUPPORT SYSTEMS, by Dan C. Popma. 1963, 18p. Paper CP-63-693; L-3525.

NASA N63-15039 OTS $2.60

Melpar, Inc., Falls Church, Va.
DETECTION OF EXTRATERRESTRIAL LIFE. METHOD II: OPTICAL ROTATORY DISPERSION. Quarterly rept. no. 1, 20 Dec 62-19 Mar 63, on Contract NASw-557. [1963] 24p.

NASA N63-15270 OTS $4.60

New York U. Coll. of Engineering, N. Y.
PRODUCTION OF OXYGEN FROM SPACE MINERALS, by E. R. Kaiser, J. Tolciss, and Kurt Komarek. Report on NASA Grant NsG-9-59. 1 Feb 63, 42p. 47 refs. Technical Rept. 690.1.

Biochemistry

BNL-777 OTS $0.50

Brookhaven National Lab., Upton, N. Y.
LABELING OF HUMAN GAMMA GLOBULIN WITH I^{124}, by M. W. Greene, L. G. Stang, Jr., and Manny Hillman. Rept. on Contract AT(30-2)GEN-16. Feb 63, 6p. 6 refs. T-293.

TID-15046 OTS $1.10

California U., Los Angeles. School of Medicine.
THE DETERMINATION OF ZINC, COPPER AND IRON IN BIOLOGICAL TISSUES - AN X-RAY FLUORESCENCE METHOD, by Geo. V. Alexander. Rept. on Contract AT(04-1)GEN-12. May 62, 10p. 6 refs.

NASA N63-16122 OTS $7.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
ASTRONAUTICS INFORMATION. EFFECTS OF STERILIZING AGENTS ON MICROORGANISMS, by Janet Swift. Rept. on Contract NAS7-100. Mar 63, 74p. 420 refs. JPLAI/LS-260, Suppl.

AD-297 938 OTS $3.60

Lockheed-California Co., Burbank.
LINGUISTIC CONSIDERATIONS OF CETACEAN SOUND PRODUCTION - II, by J. J. Dreher and W. E. Evans, Rept. on Contract Nonr-3680(00). 11 Sep 62, 36p. 3 refs. Rept. no. 16175.

DESCRIPTORS: *Cetacea, *Social communication, Underwater sound, Echo ranging, Behavior, Language.

Whistle contours recorded in various situations involving T. truncatus, T. gilli, D. bairdi, and G. Scammoni are analyzed and compared statistically for use frequency, intra - and inter-genera. Observations of behavior and associated sound production are paired where the situations permitted. Some evidence on a common cetacean language, situational usage of words, and language development in young animals is presented. (Author)

NASA N63-15041 OTS $10.10

Mississippi State U., State College.
BIOCHEMICAL STUDY OF MIXED CULTURE PROTOTYPE IN A CLOSED ECOLOGICAL SYSTEM, by Robert G. Tischer. Progress rept. no. 5, 1 July-1 Dec 62, on Grant NsG-80-60. [1962] 123p. 32 refs.

PB 163 264 Available on loan from OTS

Ohio State U. Research Foundation, Columbus.
THE PERCEPTION OF MULTIPLE-CHOICE INTELLIGIBILITY ITEMS IN THE PRESENCE OF SIMULATED PROPELLER-TYPE AIRCRAFT NOISE, by Robert T. Camp, Jr. Rept. on Contract N6onr-22525. 1 Jan 59, 51p. 8 refs. Bureau of Medicine and Surgery Research Project NM 18 02 99, rept. no. 73; AD-204 588.

DESCRIPTORS: *Perception, Intelligibility, *Speech transmission, Simulation, Aircraft, Propeller noise, *Audiometry, Hearing, *Psychoacoustics, Acoustics.

General Biology

TID-17514 OTS $6.60

Colorado State U. Research Foundation, Fort Collins.
EFFECTS OF THE ENVIRONMENT ON A WILD DEER POPULATION, by Lee E. Yeager. Technical progress report. Dec 1, 61-30 Nov 62, on Contract AT(11-1)898. 28 Nov 62, 69p.

TID-18274 OTS $2.25

Institute of Radiation Ecology, U. of Georgia, Athens.
A CONTRIBUTION TO A BIBLIOGRAPHY OF MICE OF THE GENUS MICROTUS, by Frank B. Golley. 30 Apr 63, 115p.

HW-SA-2853 OTS $1.60

Hanford Atomic Products Operation, Richland, Wash.
PROBLEMS IN ECOLOGICAL SAMPLING, by L. L. Eberhardt. Rept. on Contract AT(45-1)1350. 12 Dec 62, 15p.

AD-288 495 OTS $1.10

Pennsylvania U. [Philadelphia].
NON-THERMAL EFFECTS OF ALTERNATING ELECTRICAL FIELDS ON BIOLOGICAL STRUCTURES, by Herman P. Schwan. Annual progress rept., 1 Jan-31 Dec 61, on Contract Nonr-551(05). 21 May 62, 8p.

DESCRIPTORS: *Cells (Biology), *Membranes (Biology), Biophysics, *Dielectric properties, Electrical impedance, Electric fields, Alternating currents.

The existence of a membrane structure surrounding the pleuropneumonialike organism (PPLO) Mycoplasma gallisepticum has been established from a study of its dielectric properties over the frequency range from 0.5 to 250 Mcps. A complete theory of biological cell suspensions was developed, applicable when the size of the biological structure is no longer very large compared to the thickness of its surrounding membrane. A complete theory of "pearl chain formation", including calculations of the threshold field strength which is necessary so that small particles align under the influence of an alternating field, has been developed.

Pharmacology and Toxicology

PB 163 248 OTS $1.60

Army Chemical [Research and Development Labs.] Army Chemical Center, Md.
THE MECHANISM OF ACTION OF ANTICHOLINESTERASE COMPOUNDS, by Bernard P. McNamara. July 54, 11p. 45 refs. MISR no. 46.

DESCRIPTORS: *Cholinesterase inhibitors, *Toxicity, *Acetylcholine, Muscles, Metabolism, *Atropine.

A review of present thinking about the mechanism of action of anticholinesterase compounds is presented.

PB 163 250 OTS $1.10

Army Chemical Research and Development Labs., Army Chemical Center, Md.
TOXICITY STUDIES ON JP4-UDMH PROPELLANT FUEL, by Sidney Rothberg and Joseph L. Colbourn. Jan 57, 10p. 2 refs. CWL Technical memo 24-1.

DESCRIPTORS: *Jet engine fuels, Petroleum, *Rocket propellants, *Methyl hydrazines, Mixtures, Toxicity, *Eye, *Skin, *Toxic tolerances, Rabbits.

Radiobiology

ANL-6646 OTS $2.75

Argonne National Lab., Ill.
RADIOLOGICAL PHYSICS DIVISION SEMIANNUAL REPORT. Rept. for Jan-June 62 on Contract W31-109-eng-38. Feb 63, 173p. 52 refs.

PNE-226(P) OTS $0.75

Brigham Young U., Provo, Utah.
CLOSE-IN EFFECTS OF AN UNDERGROUND NUCLEAR DETONATION ON SMALL MAMMALS AND SELECTED INVERTEBRATES, by Clive D. Jorgensen. Rept. on OPERATION SEDAN. 1 Nov 62, 27p. 7 refs.

BNL-6643 OTS $1.60

Brookhaven National Lab., Upton, N. Y.
THE DIAGNOSIS, TREATMENT, AND PROGNOSIS OF HUMAN RADIATION INJURY FROM WHOLE BODY EXPOSURE, by Eugene P. Cronkite. Rept. on Contract AT(30-2)GEN-16. [1962] 15p.

PNE-228P OTS $1.00

California U., Los Angeles. School of Medicine.
CLOSE-IN EFFECTS OF AN UNDERGROUND NUCLEAR DETONATION ON VEGETATION. I. IMMEDIATE EFFECTS OF CRATERING, THROW-OUT AND BLAST, by W. E. Martin. Rept. on Proj. SEDAN. 1 May 63, 45p. 3 refs.

UCLA-509 OTS $5.60

California U., Los Angeles. School of Medicine.
WHY RADIOISOTOPES IN THE DIAGNOSIS OF RENAL HYPERTENSION, by George V. Taplin. Rept. on Contract AT(04-1)GEN-12. Nov 62, 56p.

TID-17580 OTS $4.60

Connecticut. U., Storrs.
COMPARATIVE STUDIES OF THE EFFECTS OF X-RADIATION ON PROTOZOA AND MAMMALS, by Jay S. Roth. Progress rept. 1 Dec 61-1 Nov 62, on Contract AT(30-1)2737. 48p.

HW-30340 OTS $1.60

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EFFECT OF BODY DISTRIBUTION AND RETENTION OF TRITIUM ON THE HAZARD OF EXPOSURE TO TRITIUM OXIDE, by Roy C. Thompson. Rept. on Contract W31-109-eng-62. 1 Jan 54, 19p. 8 refs.

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COMPARISON OF EMISSION FROM EXCITED STATES PRODUCED IN PROTEINS AND AMINO ACIDS BY ULTRAVIOLET LIGHT AND IONIZING RADIATION, by Leroy Augenstein, James Carter and others. Rept. on Contract AT(11-1)1155. [1963] 34p.

ORO-587(Vol. I) OTS $2.75

Tennessee Valley Authority, Norris.
AN ECOLOGICAL SURVEY OF WHITE OAK CREEK, 1950-1953, by Louis A. Krumholz. Rept. on Contract AT (40-1)221. Feb 54, 163p. 15 refs.

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Tennessee Valley Authority, Norris.
AN ECOLOGICAL SURVEY OF THE LIMNOLOGY OF WHITE OAK CREEK AND LAKE, by Louis A. Krumholz. Rept. on Contract AT(40-1)221. Feb 54, 180p.

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EFFECT OF IRRADIATION AND CORTISOL ON THYMUS FRACTIONS, by Ailene Herranen and Willa K. Brunkhorst. Rept. on Contract AT(30-1)2565. 1960. 11p.

TID-17426 OTS $1.10

Worcester Foundation for Experimental Biology, Shrewsbury, Mass.
EFFECT OF X-IRRADIATION ON AMINO ACID INCORPORATION INTO THYMUS CELL FRACTIONS, by Ailene Herranen. Rept. on Contract AT(30-1)2565. 1961, 9p.

TID-17427 OTS $1.10

Worcester Foundation for Experimental Biology, Shrewsbury, Mass.
A STUDY OF THE EFFECT OF IONIZING RADIATION ON LYMPHATIC TISSUE, by Ailene Herranen. Progress rept. 1 May 60-15 Nov 62, on Contract AT(30-1)1934. 8p.

CHEMISTRY

IDO-11221 OTS $1.50

Esso Research and Engineering Co., Linden, N. J.
ORGANIC COOLANT TECHNOLOGY, by J. F. Black. M. E. Conn, and P. R. Geissler. Semi-annual progress rept. no. 1, May-Oct 62, on Contract AT(10-1)1124. 14 Dec 62, 56p. 7 refs. NASA N63-16363.

UCRL-10687 OTS $2.50

Lawrence Radiation Lab., U. of California, Berkeley.
FORMATION OF ENERGETIC FRAGMENT IONS BY BOMBARDMENT OF ORGANIC MOLECULES WITH SLOW ELECTRONS, by John A. Olmsted. Doctoral thesis. Rept. on Contract W7405-eng-48. 18 Feb 63, 132p. 53 refs. NASA N63-16503.

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A SCHEME OF ANALYSES FOR LOW-LEVEL CHLORIDES, SULFATES, CARBONATES, AND PROBABLY OTHER ANIONS BY LIGHT SCATTERING, by R. W. Pitman. Rept. on Contract AT(45-1)1350. 2 Mar 61, 5p.

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Physical Chemistry

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INVESTIGATIONS OF CARBIDES AS CATHODES FOR THERMIONIC SPACE REACTORS, by A. F. Weinberg, R. G. Hudson and others. Quarterly progress rept. on Contract NAS5-1253. [1962] 54p. 7 refs. GA-2670.

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THE ACTIVATION ENERGY FOR THE SUBLIMATION OF GALLIUM NITRIDE, by Zuhair A. Munir. Thesis. Rept. on Contract W7405-eng-48. 14 Mar 63, 48p. 37 refs. NASA N63-16504.

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ABSORPTION SPECTRA OF VARIOUS METALLIC HALIDES AND OXIDES, ELEMENTAL CARBON, AND THE INERT GASES: A BIBLIOGRAPHY, comp. by Jean E. Senkin and M. Temple Milliken. Rept. on Contract W7405-eng-48. 1 Feb 63, 100p. 800 refs. NASA N63-16144.

NASA N63-15954 OTS $0.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
THE YIELD OF NITRIC OXIDE FROM PREMIXED FLAMES OF HYDROGEN AND HYDROCARBONS WITH NITROUS OXIDE, by Burton D. Fine and Albert Evans. May 63, 22p. 14 refs. Technical note D-1736.

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MONTE-CARLO CALCULATIONS. III. A GENERAL STUDY OF BIMOLECULAR EXCHANGE REACTIONS, by Normand C. Blais and Don L. Bunker. Rept. on Contract W-7405-eng-36. [1962] 32p.

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ENERGETICS TRANSFER IN THE PHOTODYNAMIC REACTION, by Leonida Santamaria. Annual progress rept. on Contract AT(30-1)2734. Nov 62. 73p.

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Oak Ridge National Lab., Tenn.
A STUDY OF HYDROLYTIC POLYMERIZATION OF LEAD(II) IN AQUEOUS PERCHLORATE MEDIA BY ULTRACENTRIFUGATION AND X-RAY DIFFRACTION, by Orland Edwin Esval. 1962, 166p.

PB 163 241 Available on loan from OTS

Ohio State U. Research Foundation, Columbus.
THERMODYNAMIC PROPERTIES OF THE SODIUM OXIDE-BORIC OXIDE SYSTEM, by G. Grenier and D. White. Technical research phase rept. on Subcontract to Contract NOas-52-1023-c. 28 Oct 55, 12p. 8 refs. Rept. no. MCC-1023-TR-183; AD-140 304.

DESCRIPTORS: *Sodium compounds, *Boron compounds, *Oxides, *Borates, Thermodynamics, Thermochemistry Heat of solution, Heat of reaction, Heat of formation.

From the heats of solution determined experimentally by Shartsis and Capps for pure boric oxide and varying mixtures of sodium borates, one of which corresponded to the composition of the pure sodium tetraborate, $Na_2O.2B_2O_3$, heats of solution of the other stable crystalline borates, sodium metaborate, sodium hexaborate, and sodium octaborate, were calculated on the assumption that the measured heats of solution of intermediate mixtures of two stable compounds are directly proportional to the amount of each compound present. Heats of reaction of oxide components to form crystalline borates were calculated from the difference between the heat of solution of the crystalline borate and that of the two pure components, sodium oxide and boric oxide. The heat of formation of the crystalline borates were obtained by adding the respective heat of reaction to the heat of formation of the two component oxides. (Author)

NASA N63-13646 OTS $5.60

Southern Research Inst., Birmingham, Ala.
A STUDY OF POLYMERS CONTAINING SILICON-NITROGEN BONDS, by Robert E. Burks, Jr. and Thomas W. Ray. Quarterly progress rept. no. 19, 4 May-3 Aug 62, and Semiannual materials rept. 4 Feb-3 Aug 62, on Contract NAS8-1510. 15 Aug 62, 58p. 12 refs. 5460-1259-XIX.

NASA N63-13647 OTS $2.60

Southern Research Inst., Birmingham, Ala.
A STUDY OF POLYMERS CONTAINING SILICON-NITROGEN BONDS, by Robert E. Burks, Jr. and Thomas W. Ray. Progress rept. no. 20, 4 Aug-3 Sep 62, on Contract NAS8-1510. 14 Sep 62, 26p. 6 refs. 5500-1259-XX.

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Southern Research Inst., Birmingham, Ala.
A STUDY OF POLYMERS CONTAINING SILICON-NITROGEN BONDS, by Robert E. Burks, Jr. and Thomas W. Ray. Progress rept. no. 21, 4 Sep-3 Oct 62, on Contract NAS8-1510. 15 Oct 62, 21p. 7 refs. 5558-1259-XXI.

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HIGH TEMPERATURE OXIDATION AND NITRIDATION OF NIOBIUM IN ULTRAHIGH VACUUM, R. A. Pasternak. Quarterly rept. no. II, 1 Sep-30 Nov 62, on Contract AT(04-3)115. 13 Dec 62, 17p. SRI Proj. PAU-4151.

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Geological Survey, Washington, D. C.
X-RAY CRYSTALLOGRAPHIC DATA FOR MINERALS, by Richard A. Robie, Philip M. Bethke and others. Feb 63, 39p. 183 refs.

NASA N63-14714 OTS $0.75

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
THE ARTIFICIAL RADIATION BELT MADE ON JULY 9, 1962, by Wilmot N. Hess. Apr 63, 19p. 5 refs. Tech. note D-1687.

NASA N63-17141 OTS $0.50

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
THE MAGNETIC FIELD OF THE RADIATION BELTS, by Syun-Ichi Akasofu and Joseph C. Cain. June 63, 10p. 5 refs. NASA TN D-1762.

PB 163 056 OTS $10.10

Sedimentological Research Lab., Florida State U., Tallahassee.
THE DISTRIBUTION OF FORAMINIFERA OFF PARTS OF THE ANTARCTIC COAST, by W. M. McKnight, Jr. [1962] 125p. 79 refs.

DESCRIPTORS: *Foraminifera, *Protozoa, *Antarctic regions, Distribution, Marine biology, Temperature, Salinity, Geography, *Ocean currents, *Sedimentation, *Taxonomy, *Paleoecology

This study deals with the Foraminifera found in twenty-eight cores collected from marine waters around Antarctica. One hundred thirty-three species of Foraminifera were identified and eighteen additional species given letter designations. The species included sixty-seven genera, many of which are confirmed to the Antarctic area. Twenty species were tested statistically in an effort to ascertain their dependency on mean grain size, sorting of the sediment, water depth and organic carbon. There were more species that tested significant to the standard deviation than any other parameter tested. The author interprets this as a dependency on current-supplied nutrients. Water depth seems to have little effect upon those species tested. (Author)

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OBSERVATIONS OF LOW-FREQUENCY HYDROMAGNETIC WAVES IN THE DISTANT GEOMAGNETIC FIELD: EXPLORER VI, by Darrell L. Judge and Paul J. Coleman, Jr. 3 July 62, 57p. 46 refs.

Climatology and Meteorology

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FREQUENCY ANALYSIS OF SOME CLIMATOLOGICAL EXTREMES AT HANFORD, by D. E. Jenne. Rept. on Contract AT(45-1)1350. 17 May 63, 37p. 3 refs. NASA N63-16534.

NASA N63-15692 OTS $1.00

Marshall Space Flight Center, National Aeronautics and Space Administration, Huntsville, Ala.
AN EVALUATION OF DETAIL WIND DATA AS MEASURED BY THE FPS-16 RADAR/SPHERICAL BALLOON TECHNIQUE, by James R. Scoggins. May 63, 34p. 4 refs. Technical note D-1572.

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GRAVITY SURVEY OF THE NEVADA TEST SITE AND VICINITY, NYE, LINCOLN, AND CLARK COUNTIES, NEVADA, by D. L. Healey and C. H. Miller. Interim rept. Nov 62, 66p.

NASA N63-16429 OTS $0.50

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
A REVIEW OF GEODETIC PARAMETERS, by William M. Kaula. May 63, 11p. 28 refs. Technical note D-1847.

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TESSERAL HARMONICS OF THE GRAVITATIONAL FIELD AND GEODETIC DATUM SHIFTS DERIVED FROM CAMERA OBSERVATIONS OF SATELLITES, by William M. Kaula. Junr 63, 20p. 28 refs. NASA TN D-1848.

Geology

RME-4538 OTS $1.25

Atomic Energy Commission. Div. of Raw Materials, Washington, D. C.
RECONNAISSANCE FOR URANIUM IN THE CUZCO-ANTA AREA, DEPARTMENT OF CUZCO, PERU, by John W. Gabelman and Victor Jordan O. Mar 59, 40p. 19 refs. Prepared in cooperation with Junta de Control de Energia Atomica, Lima (Peru).

RME-4580 OTS $1.25

Atomic Energy Commission. Div. of Raw Materials, Washington, D. C.
RECONNAISSANCE OF SOUTHERN PERU, by John W. Gabelman. Nov 61, 51p. 22 refs.

TEI-825 OTS $1.60

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GEOLOGIC MAP OF THE PLUTONIUM VALLEY QUADRANGLE, NYE AND LINCOLN COUNTIES, NEVADA, by E. N. Hinrichs and E. J. McKay. Nov 62, 15p.

TEI-824 OTS $1.60

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PRELIMINARY GEOLOGIC MAP OF THE YUCCA FLAT QUADRANGLE, NYE COUNTY, NEVADA, by E. J. McKay. Nov 62, 15p.

RME-140 OTS $0.50

Grand Junction Operations Office, Colo.
HYDROGEOCHEMICAL RECONNAISSANCE FOR URANIUM IN THE STANLEY AREA, SOUTH-CENTRAL IDAHO, by Charles T. Illsley. July 61, 21p. 6 refs.

HW-SA-2851 OTS $1.60

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TOUCHET CLASTIC DIKES IN THE RINGOLD FORMATION, by D. J. Brown and R. E. Brown. Rept. on Contract AT(45-1)1350, 3 Dec 62, 11p.

NASA N63-15726 OTS $1.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
PRIMITIVE LEAD FROM IRON METEORITES, by Royal R. Marshall and Jurg Feitknecht. Rept. on NASA Contract NAS7-100. 4 Feb 63, 20p. 21 refs. Technical rept. no. 32-371.

NASA N63-14203 OTS $1.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SOME MICROSTRUCTURES OF COMPLEX MORPHOLOGY OBSERVED IN PREPARATIONS OF CARBONACEOUS CHONDRITES MADE UNDER STERILE CONDITIONS, by Gregg Mamikunian and Michael H. Briggs. [1962] 18p. 22 refs.

Oceanography

NYO-8103 OTS $1.10

Chesapeake Bay Inst., Johns Hopkins U., Annapolis, Md.
PROGRESS REPORT (ON RESEARCH). Rept. on Contracts AT(30-1)1477 and AT(30-1)3109. 7 Jan 63, 7p.

TID-16991 OTS $4.60

Lamont Geological Observatory, Columbia U., Palisades, N. Y.
MIXING, DIFFUSION AND CIRCULATION RATES IN OCEAN WATERS. Progress rept. Oct 62, on Contract AT(30-1)2663. 47p.

AD-299 250 OTS $8.60

Texas A. and M. Coll., College Station.
STATUS OF ENVIRONMENTAL RESEARCH OFF PANAMA CITY, FLORIDA, by Roy D. Gaul. Rept. on Contract Nonr-2119(4). 25 Jan 63, 91p. 30 refs. Reference 63-2T.

DESCRIPTORS: Climatology, *Oceanology, Oceanographic data, Tides, Oceanographic equipment, *Data processing systems, *Ocean currents, *Ocean waves, Transducers, Power supplies, Telemeter systems, *Recording systems, *Fouling, Heat, Oceanographic vessels, Ecology, Fishes.

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Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
SATELLITE OBSERVATIONS OF THE EQUATORIAL IONOSPHERE, by L. J. Blumle. June 63, 11p. 16 refs. NASA TN D-1756.

NASA N63-15086 OTS $4.60

Iowa State U., Iowa City.
CHANGES IN THE STRUCTURE OF THE OUTER RADIATION ZONE ASSOCIATED WITH THE MAGNETIC STORM OF SEPTEMBER 30, 1961, by W. G. V. Rosser. Rept. on Grant NsG-233-62. [1963] 49p. 22 refs. SUI-63-7.

NASA N63-15346 OTS $3.00

Marshall Space Flight Center, National Aeronautics and Space Administration, Huntsville, Ala.
CROSS SECTIONS OF TEMPERATURE, PRESSURE, AND DENSITY NEAR THE 80TH MERIDIAN WEST, by Orvel E. Smith and William M. McMurray. May 63, 159p. 21 refs. Technical note D-1641.

NASA N63-13959 OTS $1.60

Minnesota U. School of Physics, Minneapolis.
BALLOON FLIGHT RECORD STATUS REPORT AS OF 31 DECEMBER 1961, by John R. Winckler. Feb 62, 11p.

ENGINEERING

PNE-217P OTS $1.50

Boeing Co., Seattle, Wash.
EJECTA STUDIES, by W. A. Roberts and R. H. Carlson. Rept. on Proj. SEDAN. Oct 62, 63p.

PNE-204F OTS $0.50

Bureau of Mines, Oakland, Calif.
STRUCTURAL SURVEY OF PRIVATE MINING OPERATIONS. Rept. on Proj. SEDAN. 1962. (Prepared in cooperation with Nevada Operations Office, Atomic Energy Commission). 17 Apr 63, 11p.

PNE-233F OTS $0.50

Edgerton, Germeshausen and Grier, Inc., Boston, Mass.
TIMING AND FIRING, by Ellery M. Matthews and Bernard F. Murphy. Rept. on Proj. SEDAN. Mar 63. EG&G-L-581. (Prepared in cooperation with Edgerton, Germeshausen and Grier, Inc., Las Vegas, Nev. and Edgerton, Germeshausen and Grier, Inc., Santa Barbara, Calif.).. 11p.

NASA N63-15057 OTS $9.60

General Dynamics/Fort Worth, Tex.
INVESTIGATION OF COMBINED EFFECTS OF RADIATION AND VACUUM ON ENGINEERING MATERIALS, by E. E. Kerlin and E. T. Smith. Quarterly progress rept. no. 2, 9 Feb-8 May 62, on Contract NAS8-2450. 4 June 62, 116p. 43 refs. FZK-147.

NASA N63-15349 OTS $7.60

General Dynamics/Fort Worth, Tex.
INVESTIGATION OF COMBINED EFFECTS OF RADIATION AND VACUUM AND OF RADIATION AND CRYOGENIC TEMPERATURES ON ENGINEERING MATERIALS, by E. E. Kerlin and E. T. Smith. Quarterly progress rept. no. 3, 9 May-31 July 62, on NASA Contract NAS8-2450. 15 Aug 62, 78p. 18 refs. FZK-152.

GEAP-4086 OTS $2.60

General Electric Co., San Jose, Calif.
TWO-PHASE PRESSURE LOSSES, by E. Janssen and J. A. Kervinen, Quarterly progress rept. no. 2, 12 May - 12 Aug 62, on Contract AT(04-3)189. 12 Sept 62, 23p.

NASA N63-15695 OTS $1.50

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
DESIGN AND OPERATIONAL PERFORMANCE OF A 150-KILOWATT SODIUM FLASH-VAPORIZATION FACILITY, by Landon R. Nichols, Charles H. Winzig and others. May 63, 52p. 5 refs. Technical note D-1661.

TID-17434 OTS $7.60

New Mexico U., Engineering Experiment Station, Albuquerque.
THERMAL SHOCK ANALYSIS: ANALYTICAL SOLUTION FOR THERMAL SHOCK ON THINWALLED CYLINDER. EXPERIMENTAL INVESTIGATION SETUP, by F. D. Ju and R. C. Dove, Technical Report ME-1 on Contract AT(29-1)789. July 60, 77p. SCDC-2935.

PNE-200F OTS $2.00

Off-Site Radiological Safety Organization, Public Health Service, Las Vegas, Nev.
FINAL OFF-SITE REPORT OF THE PROJECT SEDAN EVENT, JULY 6, 1962. 12 Dec 62, 91p. NASA N63-16270.

PNE-203F OTS $1.50

Reynolds Electrical and Engineering Co., Inc., Mercury, Nev.
THE SEDAN EVENT. On-Site Radiological Safety rept. Rept. on Contract AT(29-2)162. 23 Oct 62, 64p.

SCR-652 OTS $2.50

Sandia Corp., Albuquerque, N. Mex.
CONFERENCE ON CLEAN ROOM SPECIFICATIONS, HELD AT SANDIA LABORATORY, APRIL 9-10, 1963. Rept. on Contract AT(29-1)789. May 63, 121p. NASA N63-16287.

TID-17462 OTS $9.60

Sandia Corp., Albuquerque, N. Mex.
METHODS OF SIMULATING SHOCK AND ACCELERATION AND TESTING TECHNIQUES, by Max McWhirter. Rept. on Contract AT(29-1)789. Nov 62. 116p. ScDc-2939.

PNE-111F OTS $2.00

Stanford Research Inst., Menlo Park, Calif.
INTERMEDIATE RANGE EARTH MOTION MEASUREMENTS, by L. M. Swift. Rept. on Proj. GNOME. 31 Oct 62, 76p. 5 refs. NASA N63-14620.

TID-17576 OTS $2.60

Texas U., Austin.
FEASIBILITY OF CREATING SPHERICAL CAVITIES IN UNDERGROUND SALT DOMES. Progress rept., Oct-Nov 62, on Contract AT(29-2)1051. 28p.

Aeronautical Engineering

NASA N63-15771 OTS $1.00

Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
AERODYNAMIC CHARACTERISTICS OF A FULL-SCALE PROPELLER TESTED WITH BOTH RIGID AND FLAPPING BLADES AND WITH CYCLE PITCH CONTROL, by Kenneth W. Mort and Paul F. Yaggy. May 63, 34p. 3 refs. Technical note D-1774.

NASA N63-16430 OTS $0.75

Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
FULL SCALE-WIND-TUNNEL TESTS OF A MEDIUM-WEIGHT UTILITY HELICOPTER AT FORWARD SPEEDS, by John L. McCloud III, James C. Biggers and others. May 63, 31p. 8 refs. Technical note D-1887.

NASA N63-15526 OTS $0.75

Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
SIMULATOR STUDY OF THE LATERAL-DIRECTIONAL HANDLING QUALITIES OF A LARGE FOUR-PROPELLERED STOL TRANSPORT AIRPLANE, by Hervey C. Quigley and Herbert F. Lawson, Jr. May 63, 26p. 4 refs. NASA TN D-1773.

NASA N63-13864 OTS $1.50

Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
WIND-TUNNEL INVESTIGATION AT SUBSONIC AND SUPERSONIC SPEEDS OF A MODEL OF A TAILLESS FIGHTER AIRPLANE EMPLOYING A LOW-ASPECT-RATIO SWEPT-BACK WING-STABILITY AND CONTROL, by Willard G. Smith. 12 Jan 53, declassified 8 Feb 63. 52p. 7 refs. Research memo. A52J30.

PB 181 521 OTS $1.00

Applied Psychology Corp., Arlington, Va.
OUTDOOR TEST RANGE EVALUATION OF AIRCRAFT PAINT PATTERNS. Technical rept. no. 7 on Contract FAA/BRD-127. Apr 62, 33p. 18 refs. FAA proj. no. 110-512R; NASA N63-16567.

DESCRIPTORS: *Aircraft markings, *Paints, *Visual acuity, *Identification systems, Pattern recognition, Detection, Airplane models, Ranges (Establishments), Tests.

Six paint patterns representing three principles of aircraft exterior paint patterning were tested on an outdoor test range. Measures were obtained of the detectability of each pattern and the accuracy with which flight attitude could be determined from it. Eleven experienced pilots viewed four sizes of aircraft models against background panels of four different colors, under both clear and overcast skies. Models with patterns were detected more frequently than an aluminum model, but no pattern was exceptionally more detectable than any other. For accuracy of flight attitude determination, all patterned aircraft provided higher average scores than the plain aluminum with little difference among the several patterns. A pattern in which the fuselage was painted white on top, gray on the underside, with a red-orange fluorescent empennage was found to hold advantages indicating it would offer the greatest reliability across a variety of environmental conditions. (Author)

NASA N63-15778 OTS $1.25

Astro Research Corp., Santa Barbara, California.
ANALYSIS OF AXISYMMETRIC, ROTATING PRESSURIZED FILAMENTARY STRUCTURES, by O. R. Burggraf and H. U. Schuerch. Rept. on NASA Contract NASr-8. May 63, 47p. 9 refs. NASA Technical note D-1920.

NASA N63-15777 OTS $1.25

Astro Research Corp., Santa Barbara, California.
A CONTRIBUTION TO THE THEORY OF PRESSURE STABILIZED STRUCTURES, by A. C. Kyser. Rept. on NASA Contract NASr-8. May 63, 42p. 3 refs. NASA Technical note D-1919.

NASA N63-14279 OTS $1.25

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
OBSERVATIONS ON THE ROLE OF NONLINEARITY IN RANDOM VIBRATION OF STRUCTURES, by Richard H. Lyon. Rept. on NASA Contract NASr-47. Mar 63, 47p. 17 refs. NASA TN D-1872.

NASA N63-11050 OTS $1.75

Case Inst. of Tech., Cleveland, Ohio.
STRUCTURAL SYNTHESIS OF SYMMETRIC WAFFLE PLATE, by Lucien A. Schmit and Thomas P. Kicher. Rept. on NASA Contract NsG-110-61. Dec 62, 62p. 7 refs. NASA TN D-1691.

AD-278 639 OTS $21.00

Electronics and Ordnance Div., Avco Corp., Cincinnati, Ohio.
STUDY OF A TRANSPORTABLE AIR TRAFFIC COMPUTING FACILITY. Final rept. on Contract AF 19(604)7481. June 62, 370p. 2 refs. AFCRL-TDR-62-36; NASA N62-16773.

DESCRIPTORS: *Air traffic control systems, *Ground controlled approach radar, *Data processing systems, Data storage systems, *Computers, Mobile, Airplane landings, Flight paths, Glide path systems, Scheduling, Take-off, Display systems, Plan position indicators, Circuits, Design, Feasibility studies, Air traffic.

A novel path-prediction and display technique for augmenting manual radar approach control in an EMS environment results from the subject study. Capable of improving approach recovery rates from 25 touchdowns/hour to an estimated 60/hour in the AN/TSQ-47 ATC/Communications System, the recommended computing and scheduling equipment could be added in approximately one-half of an S-138 shelter.

NASA N63-13886 OTS $1.00

Flight Research Center, National Aeronautics and Space Administration, Edwards, Calif.
FLIGHT-DETERMINED STABILITY AND CONTROL DERIVATIVES OF A SUPERSONIC AIRPLANE WITH A LOW-ASPECT-RATIO UNSWEPT WING AND A TEE-TAIL, by William H. Andrews and Herman A. Rediess. Apr 59, 40p. 14 refs. NASA MEMO 2-2-59H.

NASA N63-15774 OTS $0.50

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
MANEUVER ACCELERATIONS EXPERIENCED DURING ROUTINE OPERATIONS OF A COMMERCIAL TURBOJET TRANSPORT AIRPLANE, by Paul A. Hunter and Mary W. Fetner. May 63, 8p. 4 refs. Technical note D-1801.

NASA N63-13868 OTS $2.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
THE ORIGIN AND DISTRIBUTION OF SUPERSONIC STORE INTERFERENCE FROM MEASUREMENT OF INDIVIDUAL FORCES ON SEVERAL WING-FUSELAGE-STORE CONFIGURATIONS. II. SWEPT-WING HEAVY-BOMBER CONFIGURATION WITH LARGE STORE (NACELLE). LATERAL FORCES AND PITCHING MOMENTS: MACH NUMBER, 1.61, by Norman F. Smith and Harry W. Carlson, 6 July 55, 146p. 4 refs. Research Memo. L55E26a.

NASA N63-10533 OTS $1.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
PROPELLER SLIPSTREAM EFFECTS AS DETERMINED FROM WING PRESSURE DISTRIBUTION ON A LARGE-SCALE SIX-PROPELLER VTOL MODEL AT STATIC THRUST, by Matthew M. Winston and Robert J. Huston. Dec 62, 68p. 13 refs. Technical note D-1509.

NASA N63-16160 OTS $1.25

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
QUALITATIVE EVALUATION OF EFFECT OF HELICOPTER ROTOR-BLADE TIP VORTEX ON BLADE AIRLOADS, by James Scheiman and LeRoy H. Ludi. May 63, 47p. 8 refs. Technical note D-1637.

NASA N63-13866 OTS $1.00

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
ROCKET-MODEL INVESTIGATION OF THE ROLLING EFFECTIVENESS OF A FIGHTER-TYPE WING-CONTROL CONFIGURATION AT MACH NUMBERS FROM 0.6 TO 1.5, by H. Kurt Strass and Edward T. Marley. 25 Feb 52, declassified 8 Feb 63. 36p. 3 refs. Research memo. L51128.

NASA N63-14271 OTS $1.25

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
ROOM-TEMPERATURE SHEAR AND COMPRESSION TESTS OF STIFFENED PANELS WITH INTEGRAL OR ATTACHED COOLING CIRCUITS, by Marvin B. Dow and Ralph O. Whitley. Mar 63, 44p. 3 refs. NASA TN D-1499.

NASA N63-16296 OTS $3.50

National Aeronautics and Space Administration, Washington, D. C.
PROGRESS REPORT OF THE NASA SPECIAL COMMITTEE ON MATERIALS RESEARCH FOR SUPERSONIC TRANSPORTS, by Richard H. Raring, J. W. Schultz and others. May 63, 191p. 3 refs. Technical note D-1798.

AD-298 944 OTS $2.60

National Aeronautical Establishment (Canada).
A PHOTOGRAMMETRIC METHOD OF DETERMINING THE MODE SHAPES OF VIBRATING OBJECTS, AND RESULTS FOR A THIN WING, by L. H. Ohman and M. C. van Wijk. Nov 62, 25p. Aeronautical rept. LR-362; NRC no. 7210.

DESCRIPTORS: *Supersonic airfoils, *Photogrammetry, Vibration, Photographic analysis, Model tests, Wings, Harmonic analysis, Oscillation, Aerodynamic configurations.

A photogrammetric method of measuring the maximum displacements of harmonically oscillating structure is described. A photographic exposure is taken of reference marks on the oscillating object and the photogrammetric measurements are made on the negative plate. The method has been applied to determine the normal mode shapes of a thin wing. The experimental arrangements for these tests are described and the results for the first two normal modes presented. (Author)

AD-403 484 OTS repriced $18.00

National Aviation Facilities Experimental Center, Atlantic City, N. J.
COMPUTER PROGRAMMING OF PHASE I MASTER PROGRAM. VOLUME III. APPENDIX X THROUGH APPENDIX XXI, by Don W. Vogel, Kenneth W. House and others. Final rept. June 62, 281p. Proj. no. 104-602T; NASA N63-15207, Volume 3.

DESCRIPTORS: *Data processing systems, Programming (Computers), *Air traffic control systems, *Data transmission systems, *Typewriters, Digital computers.

Contents:
Typewriter printout routine
Intercenter message routine
Departure/modification routine
Continuation routine
Cancellation routine
Readout routine
Ending routine
Machine error routine
Main frame plugboard wiring charts
High-speed printer plugboard wiring charts
Input translate and format control unit plugboard narrative and wiring charts
Output translate and format control unit plugboard narrative and wiring charts
(See also AD-403 423, AD-403 495)

PB 163 062 OTS $1.60

National Bureau of Standards, Washington, D. C.
RECENT DEVELOPMENTS IN FLIGHT CONTROLS: A SELECTED BIBLIOGRAPHY, by H. L. Mason. Rept. on Contract NAer 01623. 24 Sep 57, 15p. 64 refs. NBS Rept. no. 5496; AD-150 728.

DESCRIPTORS: *Bibliographies, *Flight control systems, Aircraft, Control systems, *Aircraft equipment, Hydraulic actuators, Pneumatic systems, Electrical equipment, Electronic equipment, Stability, Digital systems.

The selection of items covers those technical society papers, engineering journals, and government reports, chiefly from late 1956 and early 1957, which appear to be useful to design and operation of flight controls. The five sections deal with hydraulic actuation, pneumatic actuation, electrical and electronic components, artificial stability and feel, and digitized systems respectively. Arrangement is by serial number in the system developed and maintained by the NBS Office of Basic Instrumentation, followed by the author's name and affiliation, title of the article, reference, and a brief annotation of content. (Author)

AD-298 987 OTS $2.60

National Research Council of Canada, Div. of Mechanical Engineering, Ottawa.
ICE SHEDDING TESTS ON A 10-FOOT SHARP-EDGED DELTA WING AT LOW ANGLES OF ATTACK, by C. K. Rush. Dec 62, 23p. 3 refs. Aeronautical rept. LR-364; NRC no. 7212.

DESCRIPTORS: *Delta wings, *De-icing systems, Angle of attack, Model tests, Wind tunnel models, Ice.

Tests were made on a model of a sharp-edged delta wing to determine the shedding characteristics of ice formed on the leading edge. It was found that above angles of attack of 6 degrees the ice was carried over the upper surface, while below 6 degrees ice was carried over both upper and lower surfaces. The rate of ice formation on the sharp leading edge corresponds to a high collection efficiency of the edge for approaching cloud water droplets. (Author)

Chemical Engineering

HW-74210 OTS $1.60

Hanford Atomic Products Operation, Richland, Wash.
THE ELECTROSTATIC BUBBLE SCRUBBER, by R. T. Allemann and U. L. Upson. Rept. on Contract AT(45-1)1350. 9 July 62, 13p.

NYO-10301 OTS $3.00

Kellogg, M. W., Co., New York.
A TECHNICAL AND ECONOMIC EVALUATION OF SOLID-FUEL GASIFICATION USING NUCLEAR HEAT. PRODUCTION OF PIPELINE GAS, LIQUID FUELS, AND CHEMICALS FROM LIGNITE AND BITUMINOUS COAL, by L. J. Pieroni, R. P. Griffin, and W. H. Heffner. Rept. for May-Oct 62 on Contract AT(30-1)3009. 30 Nov 62, 212p. 31 refs. RD-62-952.

UCRL-10717 OTS $2.25

Lawrence Radiation Lab., U. of California, Berkeley.
LIQUID-LIQUID INTERFACIAL-TENSION MEASUREMENT WITH AN OSCILLATING JET, by Alfred E. Vandegrift, Peter N. Tenney, and Theodore Vermeulen. Rept. on Contract W7405-eng-48. 11 Mar 63, 101p. 38 refs. NASA N63-16506.

ORNL-TM-27 OTS $5.60

Oak Ridge National Lab., Tenn.
CHEMICAL TECHNOLOGY DIVISION, CHEMICAL DEVELOPMENT SECTION C PROGRESS REPORT FOR AUGUST-SEPTEMBER 1961. Rept. on Contract W-7405-eng-26. 1 Dec 61, 57p.

ORNL-TM-181 OTS $8.60

Oak Ridge National Lab., Tenn.
CHEMICAL TECHNOLOGY DIVISION, CHEMICAL DEVELOPMENT SECTION C PROGRESS REPORT FOR JANUARY-MARCH 1962, by K. B. Brown. Rept. on Contract W-7405-eng-26. 10 July 62, 91p.

ORNL-3381 OTS $1.50

Oak Ridge National Lab., Tenn.
EXPERIMENTAL BASIS FOR THE DESIGN OF MIXER SETTLERS FOR THE AMEX SOLVENT EXTRACTION PROCESS, by A. D. Ryon and R. S. Lowrie. Rept. on Contract W7405-eng-26. 3 May 63, 61p. 16 refs.

ORNL-TM-343 OTS $3.60

Oak Ridge National Lab., Tenn.
UNIT OPERATIONS SECTION MONTHLY PROGRESS REPORT, JULY 1962, by M. E. Whatley, P. A. Haas and others. Rept. on Contract W-7405-eng-26. 7 Jan 63, 39p.

PB 181 512 OTS $0.50

Pittsburgh U., Pa.
BIBLIOGRAPHY OF PUBLICATIONS ON COMPOUNDS OF GAS HYDRATE TYPE, by K. W. Allen. Aug 63, 16p. 126 refs. Office of Saline Water Research and Development Progress Rept. no. 73.

DESCRIPTORS: *Sea water, *Desalination, *Refrigerants, Gases, *Hydrates, *Bibliographies

TID-17477 OTS $9.10

Purdue U., Lafayette, Ind.
SUSPENSION OF SOLIDS BY MIXING IMPELLERS. II, by J. H. Rushton. Progress rept. on Contract AT(11-1)804. Sep 62, 106p.

Electrical and Electronic Engineering

BNL-6443 OTS $1.10

Brookhaven National Lab., Upton, N. Y.
0-2-kv FLASH TUBE SUPPLIES, by D. M. Miller. Rept. on Contract AT-30-2-GEN-16. 15 Mar 62, 8p. IHR-117.

BNL-6442 OTS $1.10

Brookhaven National Lab., Upton, N. Y.
6 kv CAPACITOR CHARGING SUPPLY, by D. M. Miller. Rept. on Contract AT-30-2-GEN-16, 15 Mar 62, 7p. IHR-116.

BNL-6437 OTS $1.10

Brookhaven National Lab., Upton, N. Y.
LOW FREQUENCY AMPLIFIER IH-130-1, by Jorge Llacer. Rept. on Contract AT-30-2-GEN-16, 23 Oct 61, 4p.

PB 163 294 Available on loan from OTS

Eagle-Picher Co., Joplin, Mo.
IMPROVEMENT OF SIGNAL CORPS STORAGE BATTERIES. Interim rept. no. 34 (Final summary, 1948), on X-Ray Program, Contract W 36-039-sc-32424. 30 Sep 48, declassified 15 June 54. 46p. AD-62 126.

DESCRIPTORS: *Storage batteries, *Meteorological batteries, *Magnesium compounds, *Copper compounds, *Chlorides, Production, Electrolytes, Flight testing, Lead compounds, Oxides, Sulfates, Carbonates, X-ray diffraction analysis.

Included is a summary of the work leading to the development of the magnesium-cuprous chloride meteorological battery. Details of preparation and use are given as well as manufacturing and cost data. Performance characteristics are included. Capacities of from 2 1/2 to 3 hours appear to be available when tested according to procedures originally outlined for this job. Actual flight tests have also run as long as 2 1/2 to 3 hours.

NASA N63-15189 OTS $2.60

Electrical Engineering Research Lab., U. of Illinois, Urbana.
A LOW INSERTION LOSS, CAPACITIVELY SCANNED GONIOMETER FOR FARADAY ROTATION MEASUREMENTS IN THE V. H. F. RANGE, by A. B. Gschwendtner and G. W. Swenson, Jr. Rept. on Grant NsG-24-59. 28 Feb 63, 27p. 3 refs.

AD-402 844 repriced OTS $2.75

General Electric Co., Schenectady, N. Y.
EVALUATION OF MOLYBDENUM EMITTER, LOW VOLTAGE ARC THERMIONIC POWER CONVERTER, by E. A. Baum. Final rept. on Contract AF 33(657)8323. Feb 63, 131p. 1 ref. ASD-TDR-63-183.

DESCRIPTORS: *Thermionic converters, *Cesium electron tubes, Molybdenum, Cathodes (Electron tubes), Life expectancy, Tests, Temperature.

Results of life tests on the planar molybdenum-emitter cesium-vapor thermionic converter operating under steady-state conditions are presented along with a description of the life-test equipment. Transient data on the effect of variations in cathode, anode, and reservoir temperatures, as well as step changes in the load, are also presented. The steady-state life tests were performed at a cathode temperature of 1450 C on a 5 sq. cm. cathode area converter design with the thermal input being supplied by a radiation-type furnace in order to more closely simulate solar cavity heating. Seven converters were tested for extended periods with nominal power outputs of 1.5 watts/sq. cm. to 2.5 watts/sq. cm. The maximum life of the state-of-the-art structure on one converter was in excess of

3000 hours and four converters were operated beyond 1000 hours without major degradation in the power output. In addition, the analyses of two converters which operated for 1200 hours and 1400 hours are discussed. (Author)

NASA N63-15278 OTS $1.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
STUDIES IN THE ASYMPTOTIC THEORY OF CONTROL SYSTEMS; I. STOCHASTIC AND DETERMINISTIC N-STAGE PROCESSES, by David S. Adorno. Rept. on Contract NASw-6. 27 May 60, 20p. 4 refs. Technical rept. no. 32-21; AD-238 060.

PB 163 267 OTS $5.60

International Resistance Co., Philadelphia, Pa.
LAYERED PRINTED WIRING, by Louis F. Guarini. Rept. no. 3 (Final), 14 Dec 59-31 May 62, on Contract DA 36-039-sc-78941. [1962] 59p.

DESCRIPTORS: *Printed circuits, Design, Production, Tests, Laminates, Feasibility studies, Miniature electronic equipment.

A development program was undertaken to investigate techniques for fabricating multi-layer laminates. Soldering terminals on the individual layers prior to final lamination and subsequent spot-facing to remove the cured resin on the terminals were found to be the preferred technique to insure 100% solderability. The process was refined and extended to produce six layer laminates having a high order of reliability. The inherent miniaturization capabilities of multi-layer printed wiring were demonstrated by the redesign of the "High Speed Teletype Reader Reperforator Integrating Board," a single layer board of maximum conductor density, into a six layer laminate with a 70% reduction in area and volume. Data were accumulated on 120 two layer samples (conductor width and spacing reduced from 0.030 to 0.020 inch) tested for moisture resistance.

PB 163 296 Available on loan from OTS

Micamold Electronics Mfg. Corp., Newark, N. J.
RECONSTITUTED MICA PAPER FOR CAPACITORS, by J. Bowser. Final rept., 1 Apr-30 June 60, on Contract DA 36-039-sc-75959. 30 June 60, 30p. AD-241 239.

DESCRIPTORS: *Mica capacitors, *Paper capacitors, *Capacitors, Mica, Paper, *Dielectrics, Foils, Mechanical properties, Electrical properties.

3300 μμf, CM 30 CAPACITORS: Fifty capacitors with 0.0015-in.-thick Isomica dielectric met all the requirements of table V of Mil-C-5A. 100 μμf, CM 70 CAPACITORS: Fifteen capacitors with 0.002-in.-thick Isomica dielectric met all the specification requirements. 100 μμf, CM 80 CAPACITORS: Eight capacitors with 0.002-in.-thick Isomica dielectric met the specification requirements in Table V of Mil-C-5A except for temperature rise and immersion. 2000 μμf, CM 80 CAPACITORS: These capacitors failed to meet the requirements of Mil-C-5A. It is not feasible to make the 2000 μμf, 10,000 VP capacitors with 0.002-in.-thick Isomica type CI reconstituted natural mica paper as dielectric. (DDC abstract)

AD-403 053 repriced $2.75

National Cash Register Co., Dayton, Ohio.
FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS, by R. R. Chamberlin, J. S. Skarman and others. Final rept. 1 Feb 62-Jan 63, on Contract AF 33(657)7919. Mar 63, 122p. 19 refs. ASD-TDR-63-223, Part I.

DESCRIPTORS: *Photoelectric cells (Semiconductor), *Semiconductor films, *Solar cells, Cadmium compounds, Sulfides, Selenides, Copper compounds, Solar radiation, Sprays, Thin films (Storage devices), Vapor plating, Feasibility studies.

The objectives were (1) to demonstrate the feasibility of fabricating a thin film photovoltaic converter using a chemical spray process for the deposition of the active elements and (2) to fabricate for delivery six experimental cells, four using CdS and two using CdSe as the n-type semiconducting layer. Research has shown the feasibility of fabricating photovoltaic converters using thin films of cadmium and copper sulfide (.6 micron and .05 micron respectively) and has shown that the deposition process used is applicable to large area, multiple layer (CdS-CdSe-Cu_2S) configurations, solid solution (Cd(S, Se)-Cu_2S) cells, and continuous line production. This research has also shown that a heterogeneous junction photovoltaic converter can be formed using CdS and Cu_2S. Six (4 CdS and 2 CdSe) cells of 16 sq in area were fabricated for delivery. The four CdS cells had an average efficiency of .2% and the two CdSe cells had an average efficiency of less than .01%. The efficiencies of the four inch square cells do not indicate the potential of the chemical spray process since CdS cells of one square inch were made with 1.2% efficiency and CdS cells of one square centimeter were made with 3.5% efficiency. All of these cells were of the back wall (incident irradiation travels through the substrate) configuration using one eighth inch hard glass as the substrate. (Author)

OTS SB-471, Revised $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
MAGNETIC RECORDING SYSTEMS. Mar 63, 14p. 190 refs. OTS Selective Bibliography SB-471, Revised.

DESCRIPTORS: *Bibliographies, *Magnetic recording systems, Information retrieval, *Magnetic tape, Computer storage devices, Recording systems.

Lists 190 references to domestic and foreign research added to the OTS collection during the period 1958 to April 1963. Covers reports on information sorting with magnetic tape devices, drop outs in magnetic tape systems, long wear magnetic tape, multiple tape queing systems, paper tape to magnetic tape converters among other subjects. (Author)

SCTM-230-62(14) OTS $1.60

Sandia Corp., Albuquerque, N. Mex.
AN EMPIRICAL DESIGN FOR HIGH-VOLTAGE PULSE RESISTORS, by Richard Lee Davis. Rept. on Contract AT(29-1)789. Nov 62, 19p.

SCTM-46-62(24) OTS $1.60

Sandia Corp., Albuquerque, N. Mex.
A PRECISE METHOD FOR MEASURING RADIO FREQUENCY PEAK PULSE POWER, by C. L. Mavis and C. J. Still. Rept. on Contract AT(29-1)789. Mar 62, 18p.

NASA N63-15799 OTS $2.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
ELECTRICAL ENERGY FROM BIOLOGICAL SYSTEMS, by J. J. Konikoff, L. W. Reynolds, and others. Rept. on Contract NASw-511. Apr 63, 22p. 7 refs.

Ordnance, Missiles, and Satellite Vehicles

AD-296 852 OTS $5.00

Aerospace Medical Research Labs. (6570th), Aerospace Medical Div., Wright-Patterson AFB, Ohio.
ACOUSTIC NOISE AND VIBRATION STUDIES AT CAPE CANAVERAL MISSILE TEST ANNEX, ATLANTIC MISSILE RANGE. VOLUME I. ACOUSTIC NOISE, by John N. Cole, Robert G. Powell, and Harald K. Hille. Rept. on Biomechanics of Aerospace Operations. Dec 62, 308p. 10 refs. ASD Technical rept. 61-608 (1).

DESCRIPTORS: *Rocket motor noise, *Acoustics, Guided missiles (Surface to surface), Statistical analysis, Mathematical prediction, Launching sites, Vibrations, Hazards, Measurement, Noise.

This report describes a measuring program to collect acoustic environmental data at Cape Canaveral Missile Test Annex during the launchings of 23 vehicles: 8 Titan, 7 Atlas, 2 Pershing, 1 Saturn, 1 Thor, 1 Jupiter, 1 Minuteman, 1 Bluescout, and 1 Polaris. Basic measured data (4.7-9600 cps) are presented and analyzed to derive statistical relationships that can be used to predict these environments for future operational situations. The program was limited to measuring those noise levels produced near the ground plant at distances ranging from 150 to 96,000 ft from the launch sites. Regression analyses of maximum level and time duration on distance from the launch site were made while considering such factors as frequency, vehicle propulsion parameters, and vehicle acceleration. Standard errors of estimate and coefficients of correlation indicated the statistical significance of these normalized and averaged relationships. (Author)

NASA N63-14681 OTS $0.75

Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
EXPERIMENTAL INVESTIGATION OF A DISK-SHAPED REENTRY CONFIGURATION AT TRANSONIC AND LOW SUPERSONIC SPEEDS, by Frank A. Lazzeroni. May 62, declassified 8 Feb 63. 27p. 10 refs. Technical memo. X-652.

NASA N63-15322 OTS $1.25

Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
ORBITS RETURNING FROM THE MOON TO A SPECIFIED GEOGRAPHIC LANDING AREA, by Luigi S. Cicolani. Apr 63, 47p. 6 refs. Technical note D-1652.

NASA N63-13475 OTS $6.60

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
CATALOGUE OF SATELLITE OBSERVATIONS, NO. C-28, by Beatrice Miller. Rept. on Grant NsG-87-60. 25 June 62, 61p. SAO Special rept. 96.

NASA N63-14268 OTS $1.60

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
ON THE SECULAR DECREASE IN THE INCLINATION OF ARTIFICIAL SATELLITES, by Rajendra C. Nigam. Rept. on Grant NsG-87-60. 21 Jan 63, 12p. 8 refs. SAO Special Rept.-112.

NASA N63-14254 OTS $3.60

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
SATELLITE ORBITAL DATA, by I. G. Izsak. Rept. on Grant NsG-87-60. 23 Jan 63, 39p. SAO Special rept.-113.

NASA N63-16298 OTS $1.00

Flight Research Center, National Aeronautics and Space Administration, Edwards, Calif.
THEORETICAL INVESTIGATION OF THE SLIDEOUT DYNAMICS OF A VEHICLE EQUIPPED WITH A TRICYCLE SKID-TYPE LANDING-GEAR SYSTEM, by Richard B. Noll and Robert L. Halasey. May 63, 32p. 14 refs. Technical note D-1828.

NASA N63-16677 OTS $8.10

General Dynamics/Fort Worth, Tex.
MEASURED EFFECTS OF THE VARIOUS COMBINATIONS OF NUCLEAR RADIATION, VACUUM, AND CRYOTEMPERATURES ON ENGINEERING MATERIALS, by E. E. Kerlin and E. T. Smith. Quarterly progress rept. 9 Nov 62-28 Feb 63, on Contract NAS8-2450. 15 Mar 63, 97p. 21 refs. FZK-163; NASA-CR-50020.

NASA N63-14404 OTS $0.75

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
ANALYTICAL THEORY OF THE STRETCH YO-YO FOR DE-SPIN OF SATELLITES, by Joseph V. Fedor. Apr 63, 21p. 3 refs. Technical note D-1676.

NASA N63-15765 OTS $0.50

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
METHODS OF EXPRESSING MASS UNBALANCE, by N. C. Schaller and J. M. Lewallen. May 63, 12p. Technical note D-1446.

NASA N63-16991 OTS $2.00

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
LONGITUDINAL RANGE ATTAINABLE BY THE CONSTANT-ALTITUDE VARIABLE-PITCH REENTRY MANEUVER INITIATED AT VELOCITIES UP TO ESCAPE VELOCITY, by E. Brian Pritchard. June 63, 80p. 10 refs. NASA TN D-1811.

NASA N63-14717 OTS $22.25

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
DESIGN PARAMETERS FOR BALLISTIC INTERPLANETARY TRAJECTORIES. PART I. ONE-WAY TRANSFERS TO MARS AND VENUS, by V. C. Clarke, Jr., W. E. Bollman, and others. Report on NASA Contract NAS7-100, 16 Jan 63, 419p. 7 refs. Technical rept. no. 32-77.

NASA N62-17986 OTS $7.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
JPL CONTRIBUTIONS TO THE 1962 NATIONAL TELEMETERING CONFERENCE, by F. M. Riddle, R. P. Mathison, B. D. Martin, J. C. Springett, D. G. Bourke. Rept. on Contract NAS7-100. 21 May 62, 77p. 48 refs. Technical memo. no. 33-88.

This report includes:
Communication with deep space vehicles (N62-17987)
Tracking techniques for interplanetary spacecraft (N62-17988)
The Mariner planetary communication system design (N62-17989)
Command techniques for the remote control of interplanetary spacecraft (N62-17990)
Deep space exploration and the probability of success (N62-17991)

NASA N63-13439 OTS $5.60

Jet Propulsion Lab., Calif. Inst, of Tech., Pasadena.
SPACE PROGRAMS SUMMARY NO. 37-19, VOLUME III FOR THE PERIOD NOVEMBER 1 TO DECEMBER 31, 1962: DEEP SPACE INSTRUMENTATION FACILITY, by W. H. Pickering. Rept. on Contract NAS7-100. 31 Jan 63, 60p. 3 refs.

NASA N63-17003 OTS $11.50

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SPACE PROGRAMS SUMMARY NO. 37-20, VOLUME VI FOR THE PERIOD JANUARY 1, 1963 TO MARCH 31, 1963. SPACE EXPLORATION PROGRAMS AND SPACE SCIENCES. Rept. on Contract NAS7-100. 30 Apr 63, 158p. 33 refs.

NASA N63-15772 OTS $0.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
AN EXPERIMENTAL INVESTIGATION OF THE EFFECTIVENESS OF SINGLE ALUMINUM METEOROID BUMPERS, by Donald H. Humes. May 63, 25p. 4 refs. Technical note D-1784.

NASA N63-16289 OTS $1.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
INVESTIGATION OF BUFFET PRESSURES ON MODELS OF LARGE MANNED LAUNCH VEHICLE CONFIGURATIONS, by George W. Jones, Jr., and Jerome T. Foughner, Jr. May 63, 71p. 8 refs. Technical note D-1633.

NASA N63-14682 OTS $1.25

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
INVESTIGATION OF THE LOW-SUBSONIC STABILITY AND CONTROL CHARACTERISTICS OF A 0.34-SCALE FREE-FLYING MODEL OF A MODIFIED HALF-CONE REENTRY VEHICLE, by James L. Hassell, Jr. and George M. Ware. Jan 62, declassified 8 Feb 63. 42p 7 refs. Technical memo. X-665.

NASA N63-15305 OTS $1.00

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
INVESTIGATION OF THE SKID-ROCKER LANDING CHARACTERISTICS OF SPACECRAFT MODELS, by Sandy M. Stubbs. Apr 63, 39p. 3 refs. Technical note D-1624.

NASA N63-15562 OTS $0.50

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
MOVING-COCKPIT-SIMULATOR STUDY OF PILOTED ENTRIES INTO THE EARTH'S ATMOSPHERE FOR A CAPSULE-TYPE VEHICLE AT PARABOLIC VELOCITY, by John W. Young and Lawrence E. Barker, Jr. May 63, 11p. 1 ref. Technical note D-1797.

NASA N63-15779 OTS $1.50

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
ORBITAL ERROR ANALYSIS OF THE SCOUT RESEARCH VEHICLE, by C. H. Woodling, Jarrell R. Elliott, and others. May 63, 53p. 1 refs. Technical note D-1639.

NASA N63-16427 OTS $1.50

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
SOME EFFECTS OF SIMULATED BENDING AND FOURTH-STAGE SIZE ON LOCAL PRESSURES AND NORMAL-FORCE DISTRIBUTIONS OF A MODEL OF A SCOUT CONFIGURATION AT A MACH NUMBER OF 3.10, by Byron M. Jaquet. May 63, 57p. 7 refs. Technical note D-1799.

NASA N63-16159 OTS $1.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
BASE HEAT TRANSFER, PRESSURE RATIOS, AND CONFIGURATION EFFECTS OBTAINED ON A 1/27 SCALE SATURN (C-1) MODEL AT MACH NUMBERS FROM 0.1 TO 2.0, by John L. Allen and Robert A. Wasko. May 63, 68p. 10 refs. Technical note D-1566.

NASA N63-14251 OTS $0.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
FEASIBILITY OF OPTIMIZING NOZZLE PERFORMANCE FOR ORBITAL-LAUNCH ROCKETS, by John R. Jack. Apr 63, 26p. 7 refs. NASA TN D-1578.

NASA N63-14025 OTS $1.00

Marshall Space Flight Center, National Aeronautics and Space Administration, Huntsville, Ala.
LAUNCH DEFLECTOR DESIGN CRITERIA AND THEIR APPLICATION TO THE SATURN C-1 DEFLECTOR, by R. L. Evans and O. L. Sparks. Mar 63, 39p. 6 refs. Technical note D-1275.

NASA N63-16993 OTS $0.75

Marshall Space Flight Center, National Aeronautics and Space Administration, Huntsville, Ala.
LUNAR FLIGHT STUDY SERIES: VOLUME 5. TRAJECTORIES IN THE EARTH-MOON SPACE WITH SYMMETRICAL FREE RETURN PROPERTIES, by Arthur J. Schwaniger. June 63, 29p. 6 refs. NASA TN D-1833.

NASA N63-11004 OTS $8.10

Marshall Space Flight Center, National Aeronautics and Space Administration, Huntsville, Ala.
METEOROID HAZARD TO SPACE VEHICLES IN ORBIT NEAR THE EARTH: A FUNCTIONAL INTERPRETATION OF THE INFORMATION FOR DESIGN AND OPERATIONS DECISIONS, by Charles C. Dalton. Dec 62, 88p. 51 refs. NASA TM X-789.

NASA N63-16671 OTS $7.60

Marshall Space Flight Center, National Aeronautics and Space Administration, Huntsville, Ala.
ORBIT-LAUNCHED NUCLEAR VEHICLE DESIGN AND PERFORMANCE EVALUATION PROCEDURE FOR ESCAPE AND PLANETARY MISSIONS, by Ronald J. Harris and Robert E. Austin. 8 Nov 62, 76p. 6 refs. Technical memo no. X-50003; MTP-P&VE-F-62-11.

NASA N63-16986 OTS $2.00

Marshall Space Flight Center, National Aeronautics and Space Administration, Huntsville, Ala.
ORBIT-LAUNCHED NUCLEAR VEHICLE DESIGN AND PERFORMANCE EVALUATION PROCEDURE FOR ESCAPE AND PLANETARY MISSIONS, by Ronald J. Harris and Robert E. Austin. June 63, 74p. 6 refs. NASA TN D-1570.

NASA N63-15775 OTS $0.75

Minneapolis-Honeywell Regulator Co., Minn.
AN APPLICATION OF TIME-OPTIMAL CONTROL THEORY TO LAUNCH VEHICLE REGULATION, by F. B. Smith, Jr. and J. A. Lovingood. Rept. on Contract NASr-27. May, 63, 23p. 9 refs. NASA Technical note D-1895.

NASA N63-16228 OTS $1.60

National Aeronautics and Space Administration, Washington, D. C.
TOWARD THE NEW HORIZONS OF TOMORROW, by Hugh L. Dryden. [1962] 16p.

NASA N63-15257 OTS $1.10

National Aeronautics and Space Administration, Washington, D. C.
THE U. S. SPACE PROGRAM, by Hugh L. Dryden. [1963] 9p.

PB 163 275 OTS $52.00

Office of Scientific Research and Development. Div. 8.
INVESTIGATION OF DOUBLE BASE POWDERS, by Linus Pauling (California Inst. of Tech.) Series of Monthly repts., Jan 43-Aug 45, on Contract OEMsr-881. 1945, declassified 2 Aug 60, 1,031p. in 5 vols. OSRD no. 2146; ATI-29 740.

DESCRIPTORS: *Explosive materials, Powders, Chromatographic analysis, Spectroscopy, Solvents, Hydrogen ion concentration, *Phthalates, Ethyl radicals, *Amines, Phenyl radicals, *Nitroglycerin, *Ballistite, *Nitrocellulose.

PB 163 283 OTS $1.10

Picatinny Arsenal, Dover, N. J.
EXAMINATION OF 20 MM RHEINMETALL AMMUNITION, by G. M. Taliaferro. 11 Aug 39, 8p. Technical rept. no. 982.

DESCRIPTORS: *Projectiles, Propelling charges, Bursting charges, Ordnance, Chemical analysis, Charges (Explosive).

Examination of several rounds which were disassembled showed that the rounds were similar to the 20 mm Solothurn Ammunition (Liesel) except for the propelling charge, burster charge and ignition primer.

PB 163 284 OTS $2.60

Picatinny Arsenal, Dover, N. J.
EXAMINATION OF 20 MM SOLOTHURN AMMUNITION, by W. H. Ewart. 23 Dec 40, 21p. Technical rept. no. 1053.

DESCRIPTORS: *Antitank ammunition, *Projectiles, *Armor piercing ammunition, Bursting charges, Ammunition propellants, Fuzes (Ordnance), Tracers (Ordnance), Metallography, Ordnance, Chemical analysis.

Fourteen rounds embracing five types of 20 m/m Ammunition for the Solothurn Anti-Tank Gun were received at this Arsenal for examination and report. Specimens of each type of round were disassembled and record drawings made for each type. One empty projectile of each type was furnished Watertown Arsenal for metallurgical examination and samples of powder, explosive, tracer mixture and detonator material were analyzed. The results of these specific analyses are incorporated in this report. (Author)

TID-17953 OTS $1.60

Sandia Corp., Albuquerque, N. Mex.
A CUMULATIVE-RESULTS PLAN FOR SMALL-SAMPLE INSPECTION, by A. F. Cone and H. F. Dodge. Rept. on Contract AT(29-1)789. Feb 63, 20p. SCDC-3048.

AD-282 705 repriced OTS $2.25

Space Technology Labs., Inc., Redondo Beach, Calif.
TECHNIQUES FOR ANALYSIS OF NONLINEAR ATTITUDE CONTROL SYSTEMS FOR SPACE VEHICLES. VOLUME 1. CHARACTERISTICS OF THE SPACECRAFT ATTITUDE CONTROL PROBLEM, by E. 1. Ergin, V. D. Norum, and T. G. Windeknecht. Final rept., Jan-Dec 61, on Contract AF 33(616)7811. June 62, 99p. 3 refs. ASD-TDR-62-208; NASA N62-17582.

DESCRIPTORS: *Spaceships, *Satellite vehicles, Satellite attitude, Nonlinear systems, Nonlinear differential equations, Orbital flight paths, Satellite vehicle trajectories, Equations, Motion, Matrix algebra, Transformations (Mathematics), Infrared scanning, Computer logic, Solar cells, Torque, Control, Control systems.

This four volume report was prepared in order to compile, describe and apply the available nonlinear analysis and design techniques for space vehicle attitude control systems and to outline additional areas of future effort to improve present analysis and design procedures. Volume I is a definition and description of the problems associated with the design of space vehicle attitude control systems. (Author)

NASA N63-15048 OTS $7.60

Stanford Research Inst., Menlo Park, Calif.
DETERMINATION OF CONDITIONS FOR MULTIPLE USE OF FREQUENCY ALLOCATIONS FOR SATELLITE COMMUNICATIONS AND GROUND SERVICES, by G. H. Hagn, A. S. Dennis and others. Final rept. on Contract NASr-49(02). Feb 63, 75p. 11 refs. SRI Proj. 3773.

Sanitation and Safety Engineering

PNE-205F OTS $0.50

Air Route Traffic Control Center, Federal Aviation Agency, Salt Lake City, Utah.
FEDERAL AVIATION AGENCY AIRSPACE CLOSURE, by Stuart Halsey. Preliminary (Final) rept. on Proj. SEDAN. 1962. 17 Apr 63, 11p. NASA N63-15458.

HASL-126 OTS $1.00

Health and Safety Lab., Atomic Energy Commission, New York.
A COMPUTER PROGRAM FOR CALCULATING NEUTRON INTERACTION BETWEEN CYLINDRICAL STORAGE CONTAINERS, by Stephen Lanes and Theodore Rosenberg. Feb 63, 36p. 7 refs. NASA N63-16385.

PB 163 334 OTS $3.60

Navy Electronics Lab., San Diego, Calif.
TRIANGULATION TESTS OF THE NORTHEAST PACIFIC SOFAR NETWORK, by J. Lesko, M. R. Miller and others. 27 Apr 50, 38p. 5 refs. Rept. 175; ATI-79 114.

DESCRIPTORS: *Air-sea rescues, *Networks, *Sound ranging, *Underwater sound, *Triangulation, *Underwater sound equipment, *Underwater explosions, Oceanographic vessels, Oceanographic data, Tests, Analysis, *Sonar, Naval operations.

An evaluation study was made of the Northeast Pacific SOFAR (sound fixing and ranging) network as a search and rescue facility. Analyses were made of records obtained during SOFAR cruises to determine the accuracy and limitations of the network for triangulation purposes, and to determine the optimum charge-weight and explosion depth. Triangulation charts for the entire area were prepared. Disturbances in the central part of the area covered by the network can be located with an average error of approx 4 nautical miles, but errors as large as 20 nautical miles are to be expected at the edge of the area. A 4-lb bomb detonated at 350 fathoms appears to give adequate signal strength for use over the entire network.

COO-274 OTS $2.25

Underwriters' Labs., Inc., Chicago, Ill.
FIRE TESTS OF SHIPPING CONTAINERS AND COBALT-60 TELETHERAPY HEAD, by Leonard H. Horn. Rept. on Contract AT(11-1)1022. 31 Mar 63, 77p.

Ship Building

PB 163 288 OTS $8.10

Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
RESEARCH ON SHIP CONTROLLABILITY. PART I: SURVEY AND LONG RANGE PROGRAM, by Haruzo Eda and C. Lincoln Crane, Jr. Rept. on Contract MA 2701, T/O 1. Oct 62, 88p. 139 refs. Rept. no. 922.

DESCRIPTORS: *Ships (Nonmilitary), Control, Maneuverability, Motion, Equations, *Ship models, *Hydrodynamics, *Marine rudders, Propellers (Marine), *Water waves, *Wind, Moments, *Control systems, *Automatic pilots, *Model basins, Bibliography.

A survey of recent developments in the field of steering and maneuvering of ships is made to provide a basis for planning a long range research program for the Maritime Administration. An attempt was made to include data from a large number of papers published in the past twenty years. A list of nearly 140 references is included at the end of the report. New facilities for controllability research are reviewed, and practices and problems of ship control discussed. Based on this survey, a five year research program is constructed. (Author)

PB 163 287 OTS $7.60

Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
RESEARCH ON SHIP CONTROLLABILITY. PART II: STEERING CHARACTERISTICS OF THE SERIES 60 (C_b 0.60), by Haruzo Eda and C. Lincoln Crane, Jr. Rept. on Contract MA 2701, T/O 1. Oct 62, 73p. 14 refs. Rept. no. 923.

DESCRIPTORS: *Ships (Nonmilitary), Control, Maneuverability, Stability, *Ship hulls, *Ship models, *Hydrodynamics, Moments, Motion, Equations, *Marine rudders, Propellers (Marine), *Model tests.

An investigation of the steering characteristics of the Series 60 (C_b = 0.60) hull form was performed as part of a broad study to improve merchant ship steering and maneuvering qualities. The experiments consisted of rotating arm tests and free turning tests of a five-foot model. Good agreement between free turning test results and predictions based on rotating arm results indicate that the linear motion prediction method is a useful tool for analyzing steering qualities. Frequency response and harmonic analysis techniques were used with lateral motion derivatives obtained on the rotating arm to predict zig-zag maneuvers of the model. (Author) (See also PB 163 288)

PB 163 293 OTS $11.50

Institute of Engineering Research, U. of California, Berkeley.
ELASTIC RESPONSE OF A STIFFENED PLATE UNDER SLAMMING LOADING, by Tamotsu Nagai. Rept. on Contract MA 2620, T.O. 1. Apr 62, 152p. 16 refs. Series no. 186, issue no. 1.

DESCRIPTORS: *Mechanics, *Panels (Structural), *Ship plates, Reinforcing materials, *Loading (Mechanics), *Impact shock, *Elasticity, Theory, Vibration, Nonlinear equations, Graphic analysis, Tables.

The response in the stiffened plate due to slamming loading is considered as superimposed vibration of both the whole structure and local vibrations of the panel plating. The local vibration in this case means the vibration of the plating panel having sides on the girders and stiffeners. To obtain an approximate solution of such a problem, the energy method is used. Two theoretical analyses are developed in order to get the whole vibration due to only the effect of bending as well as the local vibration of the bottom plate due to both effects of bending and stretching. In the local vibration we discuss the problem such as anisotropic plate, in which the bottom plate is considered as one special case. The data available to design are also given in order to decide the scantlings of a stiffened plate within the allowable amount of stress, which will be dynamically determined by experiment. (Author)

PB 163 290 OTS $3.60

Institute of Engineering Research, U. of California, Berkeley.
CONSIDERATIONS IN THE DESIGN OF A VERTICAL-DROP TEST FACILITY AT THE UNIVERSITY OF CALIFORNIA, BERKELEY, by Walter M. Maclean. Rept. on Contract MA 2620, T.O. 1. Sep 62, 37p. 14 refs. Series no. 186, issue no. 4.

DESCRIPTORS: *Ship structural components, *Ship hulls, Loading (Mechanics), *Impact shock, Ship models, *Test facilities, *Towers, Design.

A vertical-drop test facility has been proposed for use in an experimental investigation of the response of ship forward bottom structure to slam loads. Herein is presented the results of some evaluations of pertinent literature and a discussion of the considerations and test facility requirements which led to the proposed design. In addition, a brief review is given of the test facility features, its capabilities, and instrumentation requirements. (Author)

PB 163 289 OTS $8.10

Institute of Engineering Research, U. of California, Berkeley.
LARGE PERMANENT SET OF SHIP BOTTOM PLATING DUE TO SLAM LOADS, by Tamotsu Nagai. Rept. on Contract MA 2620, T.O. 1. Dec 62, 88p. 21 refs. Series no. 186, issue no. 5.

DESCRIPTORS: *Mechanics, *Structural shells, *Ship plates, *Loading (Mechanics), *Impact shock, Plasticity, *Elasticity, Theory, Statics, Vibration, Graphic analysis.

It is the aim of this paper to develop a method for determining the large permanent set of bottom plating caused by large slam loads. The theoretical analysis is carried out in two steps; first, the case of large permanent set due to only large slam load and second, the case of a large slam load applied many times. In carrying out the former, the same assumptions and principles as those used in the previous paper are reintroduced and the effect of stretching is included as well as that of bending, but in the latter case, another theorem about the limit analysis and condition of shakedown is introduced. Without this theorem the solution becomes useless since the resultant permanent set of plating tends to infinity which causes fracture.

PB 163 292 OTS $8.10

Institute of Engineering Research, U. of California, Berkeley.
PERMANENT SET OF A BOTTOM SHELL PLATE DUE TO SLAMMING LOADING, by Tamotsu Nagai. Rept. on Contract MA 2620, T.O. 1. 6 Aug 62, 81p. 10 refs. Series no. 186, issue no. 2.

DESCRIPTORS: *Mechanics, *Structural shells, *Ship plates, Reinforcing materials, *Loading (Mechanics), *Impact shock, *Plasticity, Creep, Theory, Graphic analysis, Tables.

The theoretical analysis of a bottom shell plate designed to attain a small permanent set is carried out based on the unproven assumptions that plastic actions will develop on the first application of the maximum slamming load, and that deformations of the resultant dished panel will take place elastically. Purpose of the analysis is to determine the magnitude of the small permanent set, the deflection-time relations and the energy dissipated in plastic flow. Supplementary data are also given on the rough estimation of large permanent set. The theoretical methods are applied to a sample problem illustrating how plate thickness is determined as a function of maximum stipulated permanent set. (Author)

PB 163 291 OTS $4.60

Institute of Engineering Research, U. of California, Berkeley.
A SHIP STRUCTURAL RESEARCH SURVEY AND PROGRAM, by R. Glasfeld and H. A. Schade. Rept. on Contract MA 2620, T.O. 1. June 62, 44p. 21 refs. Series no. 186, issue no. 3.

DESCRIPTORS: *Mechanics, *Ship structural components, Tensile properties, Thermal stresses, Vibration, *Ship plates, Reinforcing materials, Impact shock, Stresses, *Beams (Structural), Metals, Mechanical properties.

Contents:
Research Topics and the Current State of the Art: Longitudinal Strength; Transverse Strength; Torsional Strength; Temperature Induced Stresses; Vibration; Stiffened Plating; Local Slamming Response; Stress Concentrations; Beam Brackets and Longitudinal Connections; Properties of Metals
Proposed 5-Year Program of Ship Structural Research
Five Year Research Program Summary.

PB 163 286 OTS $5.60

Massachusetts Inst. of Tech., Cambridge.
SEAKEEPING QUALITIES OF SHIPS. PART II: THE M.I.T. SEAKEEPING TESTING FACILITY, by Michael D. Pearlman. Rept. on Contract M.A. 2701. Mar 63, 59p. 17 refs.

DESCRIPTORS: *Hydrodynamics, *Ship models, *Test facilities, *Model basins, Design, *Water waves, Generators, Programming (Computers), Spectrographic analysis, Digital systems, Analog systems.

A facility was specifically designed and constructed for seakeeping studies of ships. This facility has the capability (limited to head and stern seas) of recreating typical ocean wave systems as well as regular seas. Model instrumentation has been developed allowing any significant measurements to be automatically recorded during an experiment. A facility has also been developed which will automatically analyze and process both this model data and suitably recorded full-scale ship data. In addition, facilities are available which will convert the data to a form compatible with a digital computer, such that the analysis can be carried out digitally. The computer programs necessary for carrying out the analysis have been written and tested. A study was initiated for the purpose of determining what is required to recreate the sea with sufficient accuracy for seakeeping tests. Preliminary work indicates that it is necessary to specify the statistical distribution of water surface elevation or wave height in addition to the energy density spectrum. (Author)

PB 163 240 OTS $8.10

Stanford U., Calif.
ON THE DYNAMICS OF ANTI-ROLLING TANKS, by Joseph H. Chadwick, Jr. and Karl Klotter. Technical rept. no. 2 on Contract N6onr-25129; suppl. to Technical rept. no. 15 on Contract N6-onr-251-2. 16 Feb 53, 88p. 32 refs. AD-8034.

DESCRIPTORS: *Ship structural components, *Stabilization systems, *Ballast tanks, Pumps, Design, Differential equations, Equations of motion, Roll, Functions.

A comprehensive discussion is given of the dynamics of both active and passive U-tube tank stabilizers. The ship-tank system and one of its mechanical analogs, the double pendulum, are discussed. The differential equations of motion for the ship-tank system are established; the only simplifying assumption is that the axis of rotation is taken as fixed. The effects of the parameters on the system behavior are discussed in a general way. The passive tank is treated in particular, with special emphasis on optimization of the performance. The discussion is extended to systems with a moving axis of rotation, and a review of system parameter values in practical installations is presented. The question of coupling terms is considered. The pertinent literature is reviewed. (DDC abstract)

PB 163 239 OTS $9.10

Stanford U., Calif.
SHIP STABILIZATION IN THE LARGE: A GENERAL ANALYSIS OF SHIP STABILIZATION SYSTEMS, by Joseph H. Chadwick, Jr. Final rept. on Contract N6onr-25129. 27 Feb 53, 104p. 89 refs. AD-9114.

DESCRIPTORS: *Ship structural components, *Stabilization systems, Design, Effectiveness, Costs, *Water waves, *Servomechanisms, *Gyro stabilizers, Marine rudders, Cycloidal propellers, Shrouded propellers, Jets, *Ballast tanks, *Control systems, Bibliographies.

A general survey of the whole field of ship stabilization devices and systems is given, together with a detailed discussion of the stabilizer design problem. An explication is given for definitions of performance and cost in stabilization systems. The waveslope input is discussed. The field of stabilizing devices is classified and evaluated. A variety of control schemes are analyzed; and the control design problem is discussed. Several detectors for effective waveslope are compared. Finally, some pertinent remarks are made on the optimization of system performance. (Author)

FOOD, HANDLING, AND PACKAGING EQUIPMENT

TID-17907 OTS $1.60

Kent State U., Ohio.
STUDIES ON MARINE FOOD CHAINS WHICH COULD INTRODUCE RADIOACTIVE MATERIALS TO MAN, AND ON ANNUAL CHANGES IN CERTAIN NATURAL POPULATIONS, by Ralph W. Dexter, Final rept. on Contract AT(11-1)411. Dec 62, 14p.

SAN-1022 OTS $2.00

National Canners Association Western Research Lab., Berkeley, Calif.
APPLICATION OF RADIOCHEMISTRY TECHNIQUES IN FOOD PROCESSING RESEARCH: RADIOISOTOPIC TRACER TECHNIQUES IN EVALUATION AND IMPROVEMENT OF INDUSTRY PRACTICES FOR REMOVAL OF PESTICIDE RESIDUES FROM FOODS, ed. by Walter A. Mercer. Annual rept. on Contract AT(04-3)296. Feb 63, 92p. 18 refs.

ORO-601 OTS $0.75

Louisiana State U., Baton Rouge.
RADIATION PASTEURIZATION OF SHRIMP, by A. F. Novak and J. A. Liuzzo. Final summary rept. for Jan-Dec, 62, on Contract AT(40-1)2951. 1963. 36p. 5 refs.

MACHINERY, FABRICATION, AND ACCESSORY EQUIPMENT

PB 163 244 OTS $3.60

Air Force Flight Test Center, Edwards AFB, Calif.
THE SUPERSONIC DIFFUSER AND ITS APPLICATION TO ALTITUDE TESTING OF CAPTIVE ROCKET ENGINES, by Richard M. Foster. Jan 60, 39p. 22 refs. Rept. no. AFFTC-TR-60-1; AD-233 482.

DESCRIPTORS: *Supersonic diffusers, Supersonic nozzles, Altitude chambers, Test facilities, Rocket motors, High altitude, Supersonic flow.

This report presents the preliminary results of a development program conducted to determine the altitude simulation produced by various second and third stage rocket engines enclosed in an altitude chamber and fired through a diffuser into the atmosphere. The results of preliminary nitrogen gas tests and a qualitative description of the flow mechanism in a constant cross-sectional area supersonic diffuser are presented for various supersonic nozzle exit area to diffuser cross-sectional area ratios and supersonic nozzle shapes. To date, the majority of diffuser and supersonic nozzle configurations have been tested with nitrogen gas as a primary fluid. At present, tests are also being conducted utilizing 1000 and 3000 pound thrust solid propellant rocket engines. This experimental data will be combined with analytical results to produce a family of curves required to design a cylindrical diffuser for simulating altitude testing of a large variety of rocket engine configurations. (Author)

NASA N63-16297 OTS $0.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
PERFORMANCE OF A PLUG NOZZLE HAVING A CONCAVE CENTRAL BASE WITH AND WITHOUT TERMINAL FAIRINGS AT TRANSONIC, by Charles E. Mercer and Leland B. Salters, Jr. May 63, 26p. 5 refs. Technical note D-1804.

UCRL-7183 OTS $3.60

Lawrence Radiation Lab., U. of California, Livermore
MOLYBDENUM ALLOY COMPONENTS OF THE TORY IIA RAMJET REACTOR PROTOTYPE, by Peter Mohr. Rept. on Contract W7405-eng-48. 17 Jan 63, 31p.

NASA N63-15770 OTS $0.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
ANALYTICAL STUDY OF TURBINE-GEOMETRY CHARACTERISTICS FOR ALKALI-METAL TURBOELECTRIC SPACE POWER SYSTEMS, by Arthur J. Glassman and S. M. Futral. May 63, 31p. 7 refs. Technical note D-1710.

NASA N63-15766 OTS $1.25

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
CHARGE-EXCHANGE EFFECTS ON THE ACCELERATOR IMPINGEMENT OF AN ELECTRON-BOMBARDMENT ION ROCKET, by William R. Kerslake. May 63, 45p. 10 refs. Technical note D-1657.

NASA N63-13863 OTS $0.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
COMBUSTION PERFORMANCE OF TWO EXPERIMENTAL TURBOJET ANNULAR COMBUSTORS AT CONDITIONS SIMULATING HIGH-ALTITUDE SUPERSONIC FLIGHT, by Eugene V. Zettle, Carl T. Norgren, and Herman Mark. 26 Mar 54, declassified 8 Feb 63. 27p. 14 refs. Research memo. E54A15.

NASA N63-13876 OTS $1.25

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
EFFECT OF FUEL INJECTORS AND LINER DESIGN ON PERFORMANCE OF AN ANNULAR TURBOJET COMBUSTOR WITH VAPOR FUEL, by Carl T. Norgren and J. Howard Childs. 6 Apr 53, 47p. 3 refs. NACA RM E53B04.

NASA N63-16688 OTS $0.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
EXPERIMENTAL INVESTIGATION OF ROCKET-ENGINE ABLATIVE-MATERIAL PERFORMANCE AFTER POSTRUN COOLING AT ALTITUDE PRESSURES, by R. James Rollbuhler. June 63, 29p. 6 refs. Technical note no. D-1726.

NASA N63-16995 OTS $0.50

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
POSSIBLE EFFECTS OF NONUNIFORM FLOWS ON PERFORMANCE OF ELECTROTHERMAL THRUSTORS, by John R. Jack and John W. Schaefer. June 63, 17p. 5 refs. NASA TN D-1732.

Engines and Propulsion Systems

RFP-300 OTS $1.60

Dow Chemical Co., Denver, Colo.
FLOOR VIBRATION AND ITS EFFECT ON MACHINING CONDITIONS, by B. G. Mills. Rept. on Contract AT(29-1)1106. 15 Sep 62, 18p.

NASA N63-13677 OTS $6.60

General Electric Co., Cincinnati, Ohio.
LOW VISCOSITY BEARING STABILITY INVESTIGATION, Quarterly rept. no. 1 on Contract NAS3-2111. 1962, 65p. 16 refs.

MATERIALS

NASA N63-14277 OTS $1.00

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
A DYNAMIC THERMAL VACUUM TECHNIQUE FOR MEASURING THE SOLAR ABSORPTANCE AND THERMAL EMITTANCE OF SPACECRAFT COATINGS, by W. B. Fussell, J. J. Triolo, and J. H. Henninger. Mar 63, 30p. 9 refs. NASA TN D-1716.

NASA N63-14944 OTS $1.60

Interdisciplinary Materials Research Center, Rensselaer Polytechnic Inst., Troy, N. Y.
SEMI-ANNUAL PROGRESS REPORT NO. 4 SEPTEMBER 1, 1962 TO FEBRUARY 28, 1963, by D. Hansen and others. Report on NASA Grant NsG-100-60. 27 Mar 63, 17p.

SCTM-45-62(25) OTS $2.60

Sandia Corp., Albuquerque, N. Mex.
LONG-TERM STORAGE RESEARCH PROGRAM, by M. B. Gens and R. A. Harley. Progress rept. no. 1 on Contract AT(29-1)789. Apr 62, 26p.

Adhesives and Sealants

PB 163 279 OTS $2.60

Borden Chemical Co., Philadelphia, Pa.
INVESTIGATION OF THREADED JOINT SEALANTS AND CRIMPED JOINT SEALERS, by Wolf Karo. Monthly rept. no. 14 (Final), 30 Dec 55-31 Oct 57, on Contract DAI 28-017-501-ORD-(P)-2043. [1957] 23p. 5 refs. AD-158 661.

DESCRIPTORS: *Sealing compounds, *Polymers, *Sulfides, Joints, *Fuzes (Ordnance), *Metal joints, Chemical properties, Physical properties, Costs, Polymerization, Tests, Screw threads.

Attempts were made to supply formulations of sealants for crimped and threaded joints on fuzes. Early experiments indicated that the pot life of polysulfide sealants could be extended by modification of the accelerator mix, although this modification made the preparation of a uniform composition difficult. The breakout torques obtained was about 35 in. -lb, calculated on the basis of a 1-1/8-in. bolt diameter. Studies were made of MPL-monomer thread sealants. Primary efforts involved developing additives to MPL-monomer and new monomers related to MPL that would reduce the breakout torque, and testing various compositions both after aeration and after cure by a highly reactive initiator system. Three methods of polymerization MPL monomer were studied: (1) self-sealing polymerization, (2) a process in which MPL-monomer compositions are both activated and inhibited by an air stream, and (3) by incorporating various polymeric materials in MPL-monomer. (DDC abstract)

TID-17906 OTS $1.60

Sandia Corp., Albuquerque, N. Mex.
STRUCTURAL ADHESIVES, by Nicholas J. DeLollis. Rept. on Contract AT(29-1)-789. Dec 62, 18p. SCDC-2983.

Ceramics and Refractories

BBC-115 OTS $2.00

Brush Beryllium Co., Cleveland, Ohio.
DEVELOPMENT OF INTERMETALLIC COMPOUNDS FOR VERY HIGH TEMPERATURE APPLICATIONS, by R. M. Paine, A. J. Stonehouse, and W. W. Beaver. Annual rept. 1 Jan-31 Dec 61, on Contract AT(33-3)20. Sep 62, 86p. 6 refs. NASA N63-14621.

GEMP-22A OTS $0.50

General Electric Co., Cincinnati, Ohio.
HIGH-TEMPERATURE MATERIALS PROGRAM. Progress rept. no. 22, Part A on Contract AT(40-1)2847. 30 Apr 63, 23p. NASA N63-16596.

HW-76300 OTS $2.50

Hanford Atomic Products Operation, Richland, Wash.
CERAMICS RESEARCH AND DEVELOPMENT OPERATION. Quarterly rept. Oct-Dec 62 on Contract AT(45-1)1350. 16 May 63, 120p. NASA N63-16411.

NASA N63-13288 OTS $1.60

Hughes Aircraft Co., Culver City, Calif.
DEVELOPMENT OF REFRACTORY FABRICS, by L. E. Gates and W. E. Lent. Quarterly rept. no. 4, 3 Dec 61-2 Mar 62, on Contract NAS8-50. 15 Mar 62, 12p.

PB 162 932 Available on loan from OTS

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
IMPROVED CERAMICS, by E. J. Smoke, A. V. Illyn, and J. P. Callahan. Progress rept. no. 8, 1 Sep-1 Dec 56, on Improved Ceramics, Contract DA 36-039-64566. [1956] 86p. 32 refs. AD-141 608.

DESCRIPTORS: *Ceramic materials, Refractory materials, Shock resistance, Impact shock, Thermal stresses, *Lithium compounds, *Aluminum compounds, *Silicates, Glass, *Radio equipment, Molding materials, Dielectrics, Physical properties, Porosity.

Fuels, Lubricants, and Hydraulic Fluids

AD-266 719 OTS $26.00

Aerojet-General Corp., Sacramento, Calif.
DESIGN HANDBOOK FOR LIQUID FLUORINE GROUND HANDLING EQUIPMENT, by P. S. Gakle, L. E. White and others. Rept. on Contract AF 33(616)-6586. Dec 60, 540p. 223 refs. WADD Technical rept. 60-159.

DESCRIPTORS: *Liquefied gases, *Fluorine, Helium, *Handbooks, Oxygen, Nitrogen, Liquid rocket propellants, Gases, Hydrogen compounds, Fluorides, Production, Handling, Transportation, Storage, Safety, Toxicity, Disposal, Chemical properties, Physical properties, Fuel storage tanks, Pressure tanks, Propellant tanks, Pumps, Valves, Pipes, Seals, Instrumentation, Gas detectors, Chemical indicators, Materials, Cryogenics.

This handbook is a compilation of available design data and methods of operation representing present technical experience levels as it applies to fluorine. In addition, it includes design and operational data for liquid helium, liquid oxygen, and liquid nitrogen systems in those areas likely to be of use to a designer of a liquid fluorine facility. The handbook also contains considerable design information to assist the designer in scaling up current sizes of fluorine and cryogenic systems to meet the designers specific requirements.

NASA N63-16601 OTS $0.50

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
EXPERIMENTAL INVESTIGATION OF THE SLOSH-DAMPING EFFECTIVENESS OF POSITIVE-EXPULSION BAGS AND DIAPHRAGMS IN SPHERICAL TANKS, by Andrew J. Stofan and Irving E. Sumner. June 63, 20p. 10 refs. Technical note no. D-1712.

NASA N63-16989 OTS $0.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
EXPERIMENTAL EVALUATION OF LIQUID-FLUORINE SYSTEM COMPONENTS, by Richard L. DeWitt and Harold W. Schmidt. June 63, 22p. 5 refs. NASA TN D-1727.

NASA N63-16880 OTS $0.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
PRELIMINARY INVESTIGATION OF CATASTROPHIC FRACTURE OF LIQUID-FILLED TANKS IMPACTED BY HIGH-VELOCITY PARTICLES, by Francis S. Stepka and C. Robert Morse. May 63, 29p. 9 refs. Technical note no. D-1537.

AD-280 893 OTS $0.50

Rock Island Arsenal Lab., Ill.
REDUCTION OF FRETTING CORROSION OF GREASES BY USE OF EXTREME PRESSURE AND ANTIWEAR ADDITIVES, by S. Fred Calhoun. 20 Feb 62, 17p. 18 refs. Rept. no. 62-651; NASA N62-12404.

DESCRIPTORS: Lubricants, *Greases, *Corrosion inhibition, Antiseize compounds, Lubricant additives, Pressure, Degradation.

A machine was developed for the study of fretting and is described. Five greases and six additives were selected and evaluated for their ability to minimize fretting. Three of the additives were primarily of the Extreme Pressure type and increased the Mean Hertz Load of all greases to which they were added. Two of them reduced the fretting of all greases while the third was effective in only three of the four greases. A fourth additive, primarily an antiwear type, had a slight adverse effect upon the Mean Hertz Load and appeared to promote fretting in all greases. A lubricity type additive, when used alone or in combination with an EP and an antiwear additive, resulted in a slight decrease in fretting in the one grease in which it was tested. The effect of the additives was not uniform in all greases and some were benefited more than others. (Author)

NASA N63-16746 OTS $2.25

Rocket Research Lab., Ohio State U. Research Foundation, Columbus.
EXPERIMENTAL AND THEORETICAL STUDIES ON THE FORMATION OF DETONATION WAVES IN VARIABLE GEOMETRY TUBES, by Loren E. Bollinger, Michael C. Fong and others. Rept. on Grant NsG-44-60. June 63, 81p. 17 refs. Technical note no. D-1983.

NASA N63-13631 OTS $7.60

Southwest Research Inst., San Antonio, Tex.
LIQUID SLOSHING IN A SPHERICAL TANK FILLED TO AN ARBITRARY DEPTH, by Wen-Hwa Chu. Technical rept. no. 4 on NASA Contract NAS8-1555; Contract DA-23-072-ORD-1251. 15 Dec 62, 72p. 17 refs.

NASA N63-15260 OTS $4.60

Southwest Research Inst., San Antonio, Tex.
LONGITUDINAL FORCED VIBRATION OF PARTIALLY FILLED TANKS, by Daniel D. Kana. Technical rept. no. 6 on Contract NASw-146. 28 Feb 63, 41p. 18 refs. SwRI Proj. 4-961-2.

NASA N63-16391 OTS $0.50

Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
VARIATIONAL APPROACH TO THE CALCULATION OF CHARGE EXCHANGE CROSS SECTIONS FOR ADIABATIC COLLISIONS, by Frederick E. Alzofon and Fred C. Witteborn. May 63, 11p. 6 refs. Technical note D-1654.

WAPD-R(WB)-1 OTS $1.60

Bettis Atomic Power Lab., Pittsburgh, Pa.
DIGITAL COMPUTER PROGRAMS FOR THE STATISTICAL ANALYSIS OF DATA, by T. Shimamoto. Rept. on Contract AT(11-1)GEN-14. Oct 62, 15p.

TID-17537 OTS $9.10

Brown U., Providence, R. I.
GEOMETRIC DEFINITION OF GAUGE INVARIANCE, by Elihu Lubkin. Rept. on Contract AT(30-1)2262. 11 Nov 62, 109p.

NYO-9759 OTS $4.60

Courant Inst. of Mathematical Science, New York U., N. Y.
DIFFERENCE SCHEMES WITH HIGH ORDER OF ACCURACY FOR SOLVING HYPERBOLIC EQUATIONS, by Peter D. Lax and Burton Wendroff. Rept. on Contract AT(30-1)1480. 31 July 62, 49p. NASA N63-11198.

NYO-9192 OTS $1.60

Courant Inst. of Mathematical Sciences, New York U., N. Y.
ON THE GENERALIZED OVERRELAXATION METHOD FOR OPERATOR EQUATIONS, by W. V. Petryshyn. Rept. on Contract AT(30-1)1480. 14 June 62, 20p. 3 refs. NASA N63-11802.

NASA N63-16151 OTS $2.60

Iowa State U. of Science and Tech., Ames.
NORMAL ELLIPTIC INTEGRALS OF THE FIRST AND SECOND KINDS, by B. C. Carlson. Rept. on Grant NsG-293; Contract Nonr-220(31). [1961] 27p. 8 refs.

UCRL-10744 OTS $1.25

Lawrence Radiation Lab., U. of California, Berkeley.
CONDITIONS FOR THE DISCRETENESS OF THE SPECTRUM OF SINGULAR ELLIPTIC OPERATORS, by Harold Hanerfeld. Thesis. Rept. on Contract W7405-eng-48. Jan 63, 47p. 12 refs. NASA N63-16507.

NASA N63-15767 OTS $1.25

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
NUMERICAL EVALUATION OF ION-THRUSTER OPTICS, by Vladimir Hamza and Edward A. Richley. May 63, 42p. 11 refs. Technical note D-1665.

NASA N63-16162 OTS $1.50

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
NUMERICAL SOLUTION OF AXIALLY SYMMETRIC POISSON EQUATION: THEORY AND APPLICATION TO ION-THRUSTOR ANALYSIS. APPENDIX C: IBM 7090 ION-THRUSTOR FORTRAN CODE AND BLOCK DIAGRAM, by Vladimir Hamza and Carl D. Bogart. May 63, 59p. 4 refs. Technical note D-1711.

NASA N63-14249 OTS $0.50

Marshall Space Flight Center, National Aeronautics and Space Administration, Huntsville, Ala.
A RECURSION RELATION ASSOCIATED WITH A CERTAIN SPECIAL TYPE DETERMINANT, by E. Baylis Shanks. Apr 63, 6p. NASA TN D-1112.

DESCRIPTORS: *Vibration, *Vibrators (Mechanical), Motion, Elasticity, Damping, Ships, Equations of motion, Harmonic analysis.

This report gives formulas for the response of selected simple vibratory systems to either forced motions of their supports or to external forces. The systems treated include a sprung mass, a sprung rotor, a cantilever beam, and a general elastic system attached to a rigid base. (Author)

NASA N63-15031 OTS $2.60

Jet Propulsion Lab., Calif, Inst. of Tech., Pasadena.
THE LAMINAR BOUNDARY LAYER ON A DISK OF FINITE RADIUS IN A ROTATING FLOW. PART II. A SIMPLIFIED MOMENTUM-INTEGRAL METHOD, by Leslie M. Mack. Rept. on Contract NAS7-100. 31 Jan 63, 23p. 13 refs. Technical rept. no. 32-366.

TID-17889 OTS $9.60

Illinois U., Urbana.
DRAG AND HEAT TRANSFER OF FLUID SPHEROIDS IN STEADY MOTION, by S. Winnikow. Interim rept. on Contract AT(11-1)1069. Jan 63, 117p.

PB 181 511 OTS $1.00

Illinois U., Urbana.
A STUDY OF BRITTLE FRACTURE INITIATION IN MILD STEEL, by F. W. Barton and W. J. Hall. Rept. on Contract NObs-65790. 15 July 63, 37p. 19 refs. Ship Structure Committee Serial no. SSC-147.

DESCRIPTORS: *Ship plates, *Steel plates, *Fracture (Mechanics), *Brittleness, Plasticity, Elasticity, Stresses, Models (Simulations), Test methods, Ship structural components.

The purpose of this investigation was to study the conditions of brittle-fracture initiation in low-carbon steel. An elastic-plastic stress analysis was developed from which the state of stress along the minimum section of a notched specimen could be determined as a function of the average applied stress and the yield stress. A series of tests on plate-type specimens, with the same notch configuration as that used in the stress analysis, provided experimental values of average fracture stress under various test conditions. Application of the elastic-plastic stress analysis to the experimental results provided a theoretical prediction of the state of stress at the instant and location of fracture initiation and also an indication of the position of the elastic-plastic boundary at fracture. It was found that the stress condition necessary for brittle fracture initiation, in the mild-steel specimens studied, was achieved when the maximum tensile stress reached a critical value of approximately 246,000 psi. For a ratio of average applied stress to yield stress above a certain value, the maximum tensile stress cannot attain the necessary stress value for the initiation of a brittle fracture as defined herein, and the resulting fracture will be ductile in nature, preceded by gross plastic deformation. Results from this investigation were compared with existing information related to fracture initiation to provide a basis for evaluating both the analytical technique employed and the final results obtained.

UCRL-10598 OTS $10.50

Lawrence Radiation Lab., U. of California, Berkeley.
PHYSICAL ASPECTS OF CREEP, by John E. Dorn and Jim D. Mote. Rept. on Contract W7405-eng-48. 1963. 135p.

NASA N63-15561 OTS $0.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
RATE OF LIQUID JET BREAKUP BY A TRANSVERSE SHOCK WAVE, by Gerald Morrell, May 63, 28p. 13 refs. Technical note D-1728.

AD-275 615 repriced OTS $0.75

New York U., N. Y.
INVESTIGATION OF CREEP BUCKLING OF COLUMNS AND PLATES. PART V. THEORY OF CREEP BUCKLING OF PERFECT PLATES AND SHELLS, by George Gerard. Final rept. for Apr-Nov 61, on Materials Application, Contract AF 33(616)5807. Feb 62, 23p. 8 refs. WADC-TR-59-416, Part V; NASA N62-12515.

DESCRIPTORS: *Metal plates, Sheets, *Creep, *Buckling, Equations of state, Stresses, Deformation, Theory, Stability, Aluminum alloys, Solid state physics, *Structural shells.

A theory for creep buckling of perfect flat plates under axial compression is presented which is based on the use of an equation of state to represent the incremental stresses that arise at buckling. The theoretical results which apply to any arbitrary creep properties are directly equivalent to inelastic buckling solutions where now the tangent and secant moduli are strain rate dependent quantities. Based on these results, a general theory for plates and shells under various types of loadings is presented as a logical extension of the compressed plate case. (Author)

NASA N63-13855 OTS $8.10

Rensselaer Polytechnic Inst., Troy, N. Y.
SUSTAINED OSCILLATION OF SYSTEMS WITH DRY FRICTION AND RAMP INPUT, by C. N. Shen and Hubert Wang. Rept. on NASA Grant NsG-14-59. 1 Nov 61, 88p. 17 refs. Mech. Engin. Rept.-AC1.

NASA N63-14258 OTS $1.60

Southwest Center for Advanced Studies, Dallas, Tex.
HYDROMAGNETIC STABILITY AT A FLUID VELOCITY-DISCONTINUITY, by J. A. Fejer. Rept. on Grant NsG-269-62. 27 Dec 62, 19p. 7 refs.

NASA N63-15208 OTS $1.60

Space Technology Labs., Inc., Redondo Beach, Calif.
BUCKLING OF SHELLS UNDER DYNAMIC LOADS, by L. R. Koval and J. P. O'Neill. Quarterly rept. no. 2, 1 Dec 62-28 Feb 63, on Contract NASw-504. [1963] 14p. 3 refs. Rept. 8688-6001-RU000.

PB 181 479 OTS $2.75

Martin Marietta Corp., Denver, Colo.
BINOMIAL CONFIDENCE TABLES, 50% CONFIDENCE, FOR RELIABILITY AND QUALITY CONTROL APPLICATIONS, by E. L. Eagle and R. L. Hatfield. Apr 62, 140p. 1 ref. Rept. no. M-62-87.

DESCRIPTORS: Tables, *Binomials, *Statistical analysis, *Probability, *Reliability, *Quality control, Statistical distributions.

PB 181 480 OTS $2.75

Martin Marietta Corp., Denver, Colo.
BINOMIAL CONFIDENCE TABLES, 80% CONFIDENCE, FOR RELIABILITY AND QUALITY CONTROL APPLICATIONS. by E. L. Eagle and R. L. Hatfield. Apr 62, 132p. Rept. no. M-62-88.

DESCRIPTORS: Tables, *Binomials, *Statistical analysis, *Probability, *Reliability, *Quality control, Statistical distributions.

See also PB 181 479

PB 181 481 OTS $2.75

Martin Marietta Corp., Denver, Colo.
BINOMIAL CONFIDENCE TABLES, 90% CONFIDENCE, FOR RELIABILITY AND QUALITY CONTROL APPLICATIONS, by E. L. Eagle and R. L. Hatfield. Apr 62, 124p. Rept. no. M-62-44.

DESCRIPTORS: Tables, *Binomials, *Statistical analysis, *Probability, *Reliability, *Quality control, Statistical distributions.

See also PB 181 480

PB 181 482 OTS $2.75

Martin Marietta Corp., Denver, Colo.
BINOMIAL CONFIDENCE TABLES, 95% CONFIDENCE, FOR RELIABILITY AND QUALITY CONTROL APPLICATIONS, by E. L. Eagle and R. L. Hatfield. Apr 62, 124p. Rept. no. M-62-89.

DESCRIPTORS: Tables, *Binomials, *Statistical, analysis, *Probability, *Reliability, *Quality control, Statistical distributions.

See also PB 181 481

PB 181 483 OTS $2.50

Martin Marietta Corp., Denver, Colo.
BINOMIAL CONFIDENCE TABLES, 99% CONFIDENCE, FOR RELIABILITY AND QUALITY CONTROL APPLICATIONS, by E. L. Eagle and R. L. Hatfield. Apr 62, 116p. 1 ref. Rept. no. M-62-90.

DESCRIPTORS: Tables, *Binomials, *Statistical analysis, *Probability, *Reliability, *Quality control, Statistical distributions.

See also PB 181 482

ORNL-TM-430 OTS $1.10

Oak Ridge National Lab., Tenn.
AN IBM-7090 SUBROUTINE PACKAGE FOR MAKING LOGARITHMIC AND SEMILOGARITHMIC GRAPHS USING THE CALCOMP PLOTTER, by D. K. Trubey and M. B. Emmett. Rept. on Contract W-7405-eng-26, 12 Dec 62, 10p.

ORNL-3423 OTS $1.75

Oak Ridge National Lab., Tenn.
MATHEMATICS DIVISION ANNUAL PROGRESS REPORT, Rept. for period ending 31 Dec 62 on Contract W7405-eng-26. 17 Apr 63, 61p. 39 refs. NASA N63-15047.

PB 163 272 OTS $6.60

Stanford U., Calif.
ISOPERIMETRIC INEQUALITIES FOR CERTAIN EIGENVALUES OF A MEMBRANE, by G. Szegö. Technical rept. no. 34 on Contract N6ori-106, T.O. 5. 15 Oct 53, 61p. 6 refs. AD-19 065.

DESCRIPTORS: *Membranes, Vibration, Surface area, *Inequalities, Differential equations, Bessel functions, Functional analysis, Integral equations.

A study was made of the relations between certain eigenvalues of a vibrating membrane and the surface area of the membrane in equilibrium. The lmembrane in equilibrium was represented as a domain D of the complex $z = x + iy$ plane bounded by a single analytic curve C. A consideration of $\nabla^2 u + \mu^2 u = 0$ in D with the boundary condition $\partial u/\partial n = 0$ on C led to a formal proof of the assertion of E. T. Kornhauser-I. Stakgold that $\mu_2 \leq p(A/\pi)^{-1/2}$. Three special cases were also considered: (1) D is symmetrical of order m with respect to the origin so that it is invariant under the rotation $z' = ze^{2\pi i/m}$, where m is a positive integer greater than 1; (2) $m = 2$; and (3) D is symmetrical with respect to the real axis. Consideration was also given to nearly circular domains defined in polar coordinates (r, ϕ) by

$$r \leq 1 + \rho(\phi) = 1 + a_0 + 2 \sum_{n=1}^{\infty} (a_n \cos n\phi + b_n \sin n\phi), \text{ where}$$

the Fourier coefficients of $\rho(\phi)$ are considered infinitesimals of the first order. The second variation of the eigenvalues λ_2, λ_3, μ_2, and μ_3 were computed and compared with the area and their functionals of the domain D. (DDC abstract)

Computing Devices

TID-17551 OTS $5.60

Digital Computer Lab., U. of Illinois, Urbana.
TECHNICAL PROGRESS REPORT. PART I: HIGH-SPEED COMPUTER PROGRAM. PART II: CIRCUIT RESEARCH PROGRAM. PART III: MATHEMATICAL METHODS. PART IV: DATA REDUCTION METHODS. PART V: ILLIAC USE AND OPERATION. PART VI: CONTROL DATA CORPORATION 1604. (CDC-1604). PART VII: IBM-7090-1401 SYSTEM. PART VIII: INSTRUCTIONAL USE OF THE IBM-7090-1401 SYSTEM. PART IX: GENERAL LABORATORY INFORMATION. Rept. on Contract AT(11-1)415. Sep 62, 52p.

TID-17395 OTS $1.10

Knolls Atomic Power Lab., Schenectady, N. Y.
ON-LINE DATA REDUCTION BY ANALOG COMPUTERS, by J. E. Barnes and I. W. Underwood, Rept. on Contract W-31-109-eng-52. 9p.

PB 163 101-1 OTS $9.60

Moore School of Electrical Engineering, U. of Pennsylvania, Philadelphia.
COMMON PROGRAMMING LANGUAGE TASK, PART I, by S. Gorn and E. Parker. Final rept., 1 July 59-30 June 60, on Project ADAR, Task D, Contract DA 36-039-sc-75047. 30 June 60, 109p. 11 refs. AD60UR1; AD-248 110.

DESCRIPTORS: *Programming languages, Design, Theory, *Machine translation, Data processing systems, Computers.

The logical design of formal mixed languages is continued. The material presents a more formal definition of the concept of infinite alphabets and of the languages over such alphabets. Also, the complexes and theories of language production systems are discussed in detail. (Author)

PB 163 101-2 OTS $13.00

Moore School of Electrical Engineering, U. of Pennsylvania, Philadelphia.
COMMON PROGRAMMING LANGUAGE TASK, PART II: AUTOMATIC CODE TRANSLATION SYSTEM (ACT), by A. W. Holt, W. J. Turanski, and E. J. Parker. Final rept. 1 July 59-30 June 60, on Project ADAR, Task D, Contract DA 36-039-sc-75047. 30 June 60, 186p. 8 refs. AD60UR1; AD-248 111.

DESCRIPTORS: Programming languages, Design, Theory, *Machine translation, *Data processing systems, Computers.

The ACT System is a programmed adjunct to a general purpose computing machine (currently considered for the MOBIDIC) the purpose of which is to facilitate the initial encoding and subsequent application of specific code-to-code translation procedures. The phrase code-to-code translation is meant primarily to cover the conversion of problem oriented pseudo-codes into machine code equivalents. The ACT System provides for the housing of many distinct translation procedures-carrying algebraic, data-processing, simulation languages, etc., into any of a variety of computer codes-within the bounds of a single controlling system. The programmed components of the ACT System include: (1) An allocation interpreter - AI; (2) A core library of basic translation functions; and (3) A general translation library the content of which varies with use of the system.

NASA N63-13262 OTS $12.50

Numerical Control Lab., Case Inst. of Tech., Cleveland, Ohio.
A THEORY OF SEQUENTIAL PATTERN RECOGNITION, by James L. Costanza and Harry W. Mergler. Rept. on NASA Grant NsG-36-60, June 62, 180p. 29 refs. EDC-1-62-14.

OTS SB-470, Revised $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
MACHINE TRANSLATIONS, Apr 63, 20p. 252 refs. OTS Selective Bibliography SB-470, Rev.

DESCRIPTORS: *Bibliographies, *Machine translation, Programming (Computers), Pattern recognition, Memory devices, Philology

Lists 252 reports and translations added to the OTS collection up to April 1963. Covers research on language coding, computer analysis of sentences, predictive syntactic analysis, development of photo-memory, foreign developments in machine translations among other subjects. (Author)

MECHANICS

WAPD-230 OTS $1.25

Bettis Atomic Power Lab., Pittsburgh, Pa.
A NUMERICAL SOLUTION FOR PLATE BENDING PROBLEMS, by D. S. Griffin. Rept. on Contract AT(11-1)GEN-14. Feb 63, 52p. 19 refs. NASA N63-15206.

NASA N63-15060 OTS $3.60

Catholic U. of America, Washington, D. C.
AXIAL SHEAR VIBRATIONS OF STAR-SHAPED BARS - AN APPLICATION OF CONFORMAL TRANSFORMATION, by J. H. Baltrukonis, Kevin B. Casey and others. Technical rept. no. 4 on Grant NsG-125-61(Suppl. 1-62). Oct 62, 31p. 7 refs.

PB 163 273 OTS $12.50

Stanford U., Calif.
STEADY-STATE OSCILLATIONS IN NONLINEAR SYSTEMS OF TWO DEGREES OF FREEDOM, by Frank Robert Arnold. Technical rept. no. 24 on Contract N6onr-251, T. O. 2. 1 Dec 53, 176p. 20 refs. AD-24 163.

DESCRIPTORS: *Nonlinear systems, *Oscillation, Equations of motion, Harmonic analysis, Differential equations, numerical methods and procedures.

The Ritz averaging method is described for multi-degree-of-freedom systems in general and is applied to determine approximate solutions to the steady-state oscillation of nonlinear systems with 2 degrees of freedom. A frictionless mechanical model is used comprising a main spring-mass system on a rigid foundation which is connected to an auxiliary mass through a coupling spring. An harmonic disturbance is applied to the main mass to produce oscillations. The method is used to derive the equations which determine the effects on the system behavior of various combinations of cubic-type nonlinearities in the main and coupling springs. A study is also made of the parameter values necessary to produce a desired system behavior. All procedures are presented in general terms and then applied to specific systems. The results are shown in dimensionless response diagrams which are equivalent to plots of displacement amplitude vs frequency for various disturbance amplitudes. The completely linear form of the system is the dynamic vibration absorber. In contrast with the linear system which has 2 distinct resonance frequencies, the nonlinear systems have at most 1 resonance frequency. The analogous electrical systems comprise resistance-free coupled circuits containing nonlinear capacitances or inductances. The correspondence between mechanical and electrical systems parameters is included to permit the interpretation of the system-response diagrams with respect to the electrical analogs. (DDC abstract)

Aerodynamics and Pneumatics

NASA N63-15922 OTS $1.50

Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
LARGE-SCALE WIND-TUNNEL TESTS IN GROUND EFFECTS OF A 35° SWEPTBACK WING JET TRANSPORT MODEL EQUIPPED WITH BLOWING BOUNDARY-LAYER-CONTROL TRAILING-AND LEADING-EDGE FLAPS, by Kiyoshi Aoyagi and David H. Hickey. May 63, 54p. 3 refs. Technical note D-1884.

AD-268 821 OTS $2.60

Bendix Systems Div., Bendix Corp., Ann Arbor, Mich.
THE EQUIVALENT COMPLEX DIELECTRIC CONSTANT OF THE PLASMA COATING FORMED ABOUT THE CYLINDRICAL PORTION OF A HEMISPHERICALLY CAPPED CYLINDRICAL RE-ENTRY VEHICLE, by Paul D. Kelly and Charles M. Knop. Research note no. 31 on Contract DA 11-022-ORD-3463. 1 Mar 61, 28p. 11 refs.

DESCRIPTORS: *Re-entry aerodynamics, Re-entry vehicles, Cylindrical bodies, Hemispherical shells, *Plasma physics, Thermodynamics, Coatings, Dielectric properties, Boundary layer, *Shock waves, Transport properties, Electromagnetic properties, Density, Temperature, Tables.

Feldman's characteristic solution, describing the flow field surrounding a hemispherically capped cylinder, is used to obtain the density ρ and temperature T in the shock layer at two axial stations on the cylindrical portion of the body. This solution was computed for an altitude of 100,000 ft for the re-entry velocities of 15,000 and 25,000 ft/sec. An approximate method of extending this solution to other altitudes is discussed and applied. Tables of ρ and T in the shock layer at the two axial stations are presented for the two re-entry velocities at altitudes ranging from 50,000 to 250,000 ft in increments of 50,000 ft.

PB 163 281 OTS $6.60

[Defense Research Lab., U. of Texas, Austin].
DESIGN AND PERFORMANCE OF A VARIABLE GEOMETRY DIFFUSER FOR AN AXISYMMETRIC WIND TUNNEL, by James Burley Kyser. Rept. on Contracts NOrd-16498 and NOrd-9195. 15 Feb 56, 68p. 11 refs. Rept. no. DRL-370, CF-2480.

DESCRIPTORS: *Supersonic diffusers, *Axially symmetric flow, *Supersonic wind tunnels, Shock waves, Mach number, Wind tunnel nozzles, Superson flow, Design, Operation, Aerodynamic characteristics.

To prevent the larger second throat area required for starting a supersonic wind tunnel from penalizing the performance during the entire run, a diffuser was constructed with a movable centerbody. After the normal shock had been swallowed during starting, the centerbody was moved forward, thus constricting the flow area at the second throat. This allowed the normal shock, or shock system, to occur at a lower Mach Number, and therefore, reduced the losses.

PB 163 271 OTS $6.60

General Applied Science Labs., Inc., Westbury, N. Y.
REAL GAS CHARACTERISTICS ANALYSIS FOR THE FLOW ABOUT A BLUNTED AXISYMMETRIC CONE, by Anthony Martellucci. Rept. on Contract AF 33(616)6692. May 60, declassified 14 July 60, 67p. 6 refs. Data rept. no. 5134-4; Technical rept. no. 162; AD-252 900.

DESCRIPTORS: *Blunt bodies, *Shock waves, *Hypersonic flow, Gas flow, Conical bodies, Mode tests, Subsonic flow, Boundary layer.

Results of a real gas characteristic analysis of the flow about an axisymmetric blunted 15 deg semiapex angle circular cone are presented. The model tested was 10.75 in. in length with a 0.40-in. nose radius. Pressure and heat transfer data were obtained over a 60 deg angle of attack. Approximate analytical methods for predicting the flow properties are given. The method was only programmed for zero body incidence. (DDC abstract)

NYO-9188 OTS $2.60

Courant Inst. of Mathematical Sciences, New York U., N. Y.
ON CERTAIN FINITE DIFFERENCE SCHEMES FOR THE EQUATIONS OF HYDRODYNAMICS, by John Gary. Rept. on Contract AT(30-1)1480. 1 Mar 62, 23p. 7 refs. NASA N63-11197.

PB 163 266 OTS $3.60

David Taylor Model Basin, Washington, D. C.
SOME CASES OF VIBRATION FORCED BY BASE MOTIONS OR BY EXTERNAL FORCES, by E. H. Kennard. Dec 60, 39p. 4 refs. Rept. 1394.

NASA N63-12499 OTS $2.00

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
AERODYNAMIC CHARACTERISTICS FOR COMBINED ANGLES OF ATTACK AND SIDESLIP OF A LOW-ASPECT-RATIO CRUCIFORM-WING MISSILE CONFIGURATION EMPLOYING VARIOUS CANARD AND TRAILING-EDGE FLAP CONTROLS AT A MACH NUMBER OF 2.01, by Ross B. Robinson and M. Leroy Spearman. Oct 58, 72p. 3 refs. NASA MEMO 10-2-581.

NASA N63-17302 OTS $0.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
AERODYNAMIC CHARACTERISTICS IN PITCH AT A MACH NUMBER OF 2.01 OF SEVERAL WING-BODY COMBINATIONS WITH WEDGE-SHAPED BODIES LOCATED ABOVE AND BELOW A 54.5° SWEPT DELTA WING, by Odell A. Morris. June 63, 23p. 4 refs. NASA TN D-1823.

NASA N63-16428 OTS $1.25

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
AERODYNAMIC EFFECTS OF MODIFYING WITH INBOARD TRAILING-EDGE CHAMBER OF A MODEL AT HIGH SUBSONIC SPEEDS, by Richard J. Re. May 63, 44p. 5 refs. Technical note D-1809.

NASA N63-16186 OTS $0.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
AERODYNAMIC INTERACTION EFFECTS AHEAD OF RECTANGULAR SONIC JETS EXHAUSTING PERPENDICULARLY FROM A FLAT PLATE INTO A MACH NUMBER 6 FREE STREAM, by David J. Romeo. May 63, 30p. 9 refs. Technical note D-1800.

NASA N62-16471 OTS $1.50

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
AIR-HELIUM SIMULATION OF THE AERODYNAMIC FORCE COEFFICIENTS OF CONES AT HYPERSONIC SPEEDS, by Charles L. Ladson and Thomas A. Blackstock, Oct 62, 58p. 17 refs. NASA TN D-1473.

NASA N63-17301 OTS $1.50

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
CENTER-LINE PRESSURE DISTRIBUTIONS ON TWO-DIMENSIONAL BODIES WITH LEADING-EDGE ANGLES GREATER THAN THAT FOR SHOCK DETACHMENT AT MACH NUMBER 6 AND ANGLES OF ATTACK UP TO 25°, by Theodore J. Goldberg, George C. Ashby, Jr., and James G. Hondros. June 63, 56p. 5 refs. NASA-TN D-1793.

NASA N63-14278 OTS $1.50

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
A COMPARISON OF EXPERIMENTAL AND THEORETICAL RESULTS FOR THE COMPRESSIBLE TURBULENT-BOUNDARY-LAYER SKIN FRICTION WITH ZERO PRESSURE GRADIENT, by John B. Peterson, Jr. Mar 63, 56p. 29 refs. NASA TN D-1795.

NASA N63-16185 OTS $0.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
EFFECT OF AERODYNAMIC HEATING ON THE FLUTTER OF THIN FLAT-PLATE ARROW WINGS, by Joseph M. Groen and Richard Rosecrans. May 63, 24p. 8 refs. Technical note D-1788.

NASA N63-13882 OTS $1.25

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
EFFECT OF CONTROL TRAILING-EDGE THICKNESS OR ASPECT RATIO ON THE OSCILLATING HINGE-MOMENT AND FLUTTER CHARACTERISTICS OF A FLAP-TYPE CONTROL AT TRANSSONIC SPEEDS, by William C. Moseley, Jr., and Robert F. Thompson. Apr 58, 44p. 9 refs. NACA RM L58B25.

NASA N63-13875 OTS $1.25

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
FREE-FLIGHT AERODYNAMIC-HEATING DATA AT MACH NUMBERS UP TO 10.9 ON A FLAT-FACED CYLINDER, by William M. Bland, Jr., Andrew G. Swanson, and Ronald Kolenkiewicz. 13 Jan 58, declassified 8 Feb 63. 48p. 17 refs. Research memo. L57K29.

NASA N63-13890 OTS $1.25

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
FREE-FLIGHT HEAT-TRANSFER INVESTIGATION AT SUPERSONIC SPEEDS OF TWO SLENDER CONE-CYLINDER BODIES AT AN ANGLE OF ATTACK OF 8° WITH ONE BODY ROTATING, by Ralph A. Falanga. Jan 59, declassified 8 Feb 63. 43p. 7 refs. Memorandum 12-31-58L.

NASA N63-16294 OTS $1.50

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
HEAT-TRANSFER AND PRESSURE DISTRIBUTIONS AT MACH NUMBERS OF 6.0 AND 9.6 OVER TWO REENTRY CONFIGURATIONS FOR THE FIVE-STAGE SCOUT VEHICLE, by Paul F. Holloway and James C. Dunavant. May 63, 52p. 11 refs. Technical note D-1790.

NASA N63-10991 OTS $6.00

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
HEAT-TRANSFER AND PRESSURE MEASUREMENTS ON A FLAT-PLATE SURFACE AND HEAT-TRANSFER MEASUREMENTS ON ATTACHED PROTUBERANCES IN A SUPERSONIC TURBULENT BOUNDARY LAYER AT MACH NUMBERS OF 2.65, 3.51, AND 4.44, by Paige B. Burbank, Robert A. Newlander, and others. Dec 62, 424p. 15 refs. Technical note D-1372.

NASA N63-13874 OTS $1.25

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
HEAT-TRANSFER MEASUREMENTS IN FREE FLIGHT AT MACH NUMBERS UP TO 14.6 ON A FLAT-FACED CONICAL NOSE WITH A TOTAL ANGLE OF 29°, by Charles B. Rumsey and Dorothy B. Lee. 24 Jan 58, declassified 8 Feb 63. 44p. 9 refs. Research memo. L57L03.

NASA N63-15773 OTS $0.50

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
HELIUM CONCENTRATIONS DOWNSTREAM OF A VENT EXHAUSTING HELIUM AT SONIC VELOCITY INTO A SUPERSONIC STREAM OF AIR AT MACH NUMBERS OF 3.51 AND 4.50, by Robert L. Stallings, Jr. and Paul W. Howard. May 63, 21p. 3 refs. Technical note D-1787.

NASA N63-15694 OTS $1.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF SEVERAL FIFTH-STAGE SCOUT REENTRY VEHICLES FROM MACH NUMBER 0.60 TO 24.4 INCLUDING SOME REYNOLDS NUMBER EFFECTS ON STABILITY AT HYPERSONIC SPEEDS, by Patrick J. Johnston. May 63, 66p. 8 refs. Technical note D-1638.

NASA N63-15507 OTS $0.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
PRESSURE AND HEAT-TRANSFER MEASUREMENTS ON THE FLAT FACE OF A BLUNTED 10° HALF-CONE BODY (SEMIDISK) AT A MACH NUMBER OF 6.15, by P. Calvin Stainback. May 63, 22p. 10 refs. Technical note D-1628.

NASA N63-15307 OTS $0.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
STATIC AERODYNAMIC CHARACTERISTICS OF A THREE-STAGE ROCKET VEHICLE HAVING VARIOUS FIN CONFIGURATIONS AT LOW SUBSONIC MACH NUMBERS AND ANGLES OF ATTACK UP TO 28°, by Clarence A. Brown, Jr. and Lawrence E. Putnam. Apr 63, 27p. 7 refs. Technical note D-1786.

NASA N63-16295 OTS $1.25

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
A STUDY OF SEVERAL FACTORS AFFECTING THE FLUTTER CHARACTERISTICS CALCULATED FOR TWO SWEPT WINGS BY PISTON THEORY AND BY QUASI-STEADY SECOND-ORDER THEORY AND COMPARISON WITH EXPERIMENTS, by Robert M. Bennett and E. Carson Yates, Jr. May 63, 42p. 16 refs. Technical note D-1794.

NASA N63-16745 OTS $0.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
VIBRATIONAL-NONEQUILIBRIUM FLOW OF NITROGEN IN HYPERSONIC NOZZLES, by Wayne D. Erickson. June 1963, 29p. 10 refs. Technical note no. D-1810.

NASA N63-15768 OTS $1.00

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
HYDROMAGNETIC STAGNATION-POINT BOUNDARY LAYER WITH ARBITRARY PRESSURE GRADIENT AND MAGNETIC FIELD, by Willis H. Braun. May 63, 36p. 13 refs. Technical note D-1703.

NASA N63-13865 OTS $1.00

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
PERFORMANCE OF ISENTROPIC NOSE INLETS AT MACH NUMBERS OF 5.6, by Harry Bernstein and Rudolph C. Haefeli. 6 May 54, declassified 8 Feb 63. 40p. 13 refs. Research memo. E54B24.

NASA N63-15957 OTS $0.50

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
A STEADY-STATE, STAGNATION-POINT, HEAT-TRANSFER-RATE MEASURING DEVICE, by George E. Glawe, Lloyd N. Krause and others. May 63, 17p. 31 refs. Technical note D-1704.

PB 163 282 OTS $4.60

Rosemount Aeronautical Labs., U. of Minnesota, Minneapolis.
APPLICATION OF THE GENERALIZED FREE JET ANALYSIS TO A CONVENTIONAL VARIABLE GEOMETRY FREE JET TUNNEL, by Rudolf Hermann and Kenneth O. Thompson. Rept. on Contract AF 40(600)713. July 59, 41p. 8 refs. Rept. no. AEDC-TN-59-72.

DESCRIPTORS: *Supersonic wind tunnels, Geometric forms, Aerodynamic configurations, Effectiveness, Analysis, *Jets, Supersonic diffusers, *Wind tunnel nozzles, Wind tunnel models, Drag, Thermodynamics, Entropy.

The equations of conservation of mass, momentum, and energy are applied to a conventional (as opposed to shroud type) free jet tunnel. Terms accounting for model drag, and mass addition or removal are included. The effects of these terms in conjunction with variable tunnel geometry is predicted by the analysis. Available experimental results and a few additional tests done for this investigation show fair agreement. The lowest plenum chamber pressure permitted by entropy considerations is computed by two methods. Experimental results show the simpler derivation slightly less accurate but adequate for design purpose. (Author)

PB 163 255 OTS $1.60

Wisconsin U. Engineering Experiment Station, Madison.
NEWTONIAN AND NON-NEWTONIAN VISCOSITY DETERMINATIONS ON A CONE AND PLATE VISCOMETER, by John C. Biery and John D. Huppler. Rept. no. 19 on Grant G11996. 1 Sep 62, 18p. 7 refs.

DESCRIPTORS: *Viscosimeters, Design, Operation, Sucrose, Glycerols, Polymers, *Fluid flow, Viscosity, Determination.

Newtonian and non-Newtonian viscosities were determined on a commercially available cone and plate viscometer with errors of less than 2% being consistently attained. Presented in this article are two novel equipment modifications and a modified, reliable operating procedure which made the above accuracy possible. For non-Newtonian fluids the viscometer gave an estimate of the limiting viscosity at zero rate of shear. (Author)

METALLURGY

NASA N63-15397 OTS $1.60

Battelle Memorial Inst., Columbus, Ohio.
ENGINEERING PROPERTIES OF POTASSIUM, by Alexis W. Lemmon, Jr. Quarterly rept. no. 9, 1 Oct-31 Dec 62, on Contract NAS5-584. 30 Jan 63, 17p. 7 refs.

PB 163 242 OTS $5.60

Battelle Memorial Inst., Columbus, Ohio.
INVESTIGATION ON NOTCH SENSITIVITY OF HEAT-RESISTANT ALLOYS AT ELEVATED TEMPERATURE (RUPTURE STRENGTH OF NOTCHED BARS AT HIGH TEMPERATURES), by R. L. Carlson, R. J. MacDonald, and W. F. Simmons. Rept. on High Temperature Alloys, Contract AF 18(600)61. Oct 54, 60p. 5 refs. WADC Technical rept. 54-391; AD-53 555.

DESCRIPTORS: *Heat resistant metals and alloys, *Chromium alloys, *Nickel alloys, *Cobalt alloys, *Iron alloys, Rods, Tensile properties, Hardness, Ductility, *Rupture, *Shear stresses, High temperature research.

Stress-rupture tests were conducted on notched and unnotched or plain bars of S-816, Inconel 'X' Type 550, and Waspaloy alloys at test temperatures ranging from 1200°F to 1600°F. The notched specimens had 50 per cent, 60-degree, V-notches with the root radii ranging from 0.005 inch to 0.100 inch. In some tests, as many as three notches of different root radii were used. The test results indicated that S-816 alloy was notch strengthened by all of the notches used, in the temperature range from 1350°F to 1600°F. Inconel 'X' Type 550 was always notch strengthened by all of the notches only at the test temperature of 1600°F. Waspaloy was always notch strengthened by all notches only at the temperature of 1500°F. Both Inconel 'X' Type 550 and Waspaloy could be notch strengthened for some test conditions (notch sharpness and time) at temperatures below 1600°F and 1500°F, respectively. Factors considered to have an influence on stress-rupture behavior have been studied and the results are included. The factors investigated are notch geometry, notched and unnotched ductility, the modes of deformation and fracture, metallurgical changes and surface condition. The influence of some of these factors can vary considerably from alloy to alloy. It does not appear possible, therefore, to evaluate the notch and unnotched stress-rupture behavior of a given alloy completely by any simple method. Rather, an evaluation should be based upon the combined consideration of those factors that are influential in each individual case. (Author)

PB 163 278 OTS $1.60

Brown U. Div. of Applied Mathematics, Providence, R. I.
THE ROLLING OF A THIN SHEET BETWEEN CYLINDRICAL ROLLS WITH COULOMB FRICTION, by H. I. Ansoff. Technical rept. no. 25 on Contract N7onr-358, T.O. 1 Dec 48, 18p. 9 refs. A11-25/15; ATI-202 806.

DESCRIPTORS: *Mechanics, *Sheets, *Material forming, Rolling mills, Cylindrical bodies, Friction, Stresses, Velocity, Distribution, *Plasticity, Partial differential equations

TID-17902 OTS $3.60

Colorado School of Mines, Golden.
EFFECT OF SIZE ON OPTIMUM HARDNESS OF BOLTS, by Huai-Pu Chu. Rept. on Contract AT(11-1)1173. 34p.

TID-17586 OTS $1.60

Columbia U., New York.
IMPURITY EFFECT ON QUENCHED-IN VACANCY ANNEALING KINETICS IN 99.999% Au, by Dexter Jeannotte. Rept. on Contract AT(30-1)2921. Nov 62, 13p.

TID-17546 OTS $1.60

Delaware U., Newark.
STATISTICAL THERMODYNAMICS OF METALLIC SOLUTIONS, by L. P. Skolnick. Annual progress rept. 31 Jan 62-31 Jan 63, on Contract AT(30-1)2722. 18 Dec 62, 19p.

TID-17893 OTS $1.10

Illinois U., Urbana.
ANNEALING OF COLD WORKED METALS, by P. A. Beck, B. G. Ricketts and others. Progress rept. no. 11 on Contract AT(11-1)1124. 31 Dec 62, 4p.

NASA N63-17340 OTS $1.25

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
INVESTIGATION OF MECHANICAL PROPERTIES AND METALLURGICAL CHARACTERISTICS OF A METALLIC CHROMIUM AND MAGNESIUM OXIDE COMPOSITE, by Charles R. Manning, Jr., and Dick M. Royster. June 63, 45p. 7 refs. NASA TN-D-1785.

UCRL-6932 OTS $1.60

Lawrence Radiation Lab., U. of California, Livermore.
ISOSTATIC COMPACTION OF PARTICULATE PURE METALS WITHOUT CONTAMINATION, by R. F. Bunshah and R. S. Juntz. Rept. on Contract W7405-eng-48. 18 Jan 63, 16p.

NASA N63-14250 OTS $1.50

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
FATIGUE BEHAVIOR OF MATERIALS UNDER STRAIN CYCLING IN LOW AND INTERMEDIATE LIFE RANGE, by Robert W. Smith, Marvin H. Hirschberg, and S. S. Manson. Apr 63, 57p. 12 refs. NASA TN D-1574.

NASA N63-15769 OTS $0.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
INFLUENCE OF MICROSTRUCTURAL INCLUSIONS ON FRICTION AND WEAR OF NICKEL AND IRON IN VACUUM TO 10^{-9} MILLIMETER OF MERCURY, by Donald H. Buckley and Robert L. Johnson. May 63, 25p. 14 refs. Technical note D-1708.

NASA N63-16161 OTS $1.25

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
PRELIMINARY INVESTIGATION OF MELTING, EXTRUDING, AND MECHANICAL PROPERTIES OF ELECTRON-BEAM-MELTED TUNGSTEN, by Walter R. Witzke, Earl C. Sutherland and others. May 63, 42p. 20 refs. Technical note D-1707.

NASA N63-14272 OTS $4.00

Marshall Space Flight Center, National Aeronautics and Space Administration, Huntsville, Ala.
OPTICAL PROPERTIES OF SATELLITE MATERIALS - THE THEORY OF OPTICAL AND INFRARED PROPERTIES OF METALS. Mar 63, 252p. 84 refs. NASA TN D-1523.

NASA N63-16227 OTS $1.60

Massachusetts Inst. of Tech., Cambridge.
PROGRESS REPORT, SEPTEMBER 1, 1962 - FEBRUARY 28, 1963, by Jens G. Rasmussen, Michio Yamazaki, and Nicholas J. Grant. Rept. on NASA Grant NsG-117-61. 1963, 19p. DSR-8692.

PB 163 243 OTS $1.60

Materials Lab. [Aeronautical Systems Div.] Wright-Patterson AFB, Ohio.
INVESTIGATION ON NOTCH SENSITIVITY OF HEAT-RESISTANT ALLOYS AT ELEVATED TEMPERATURES. SUPPLEMENT 1 - APPARENT VOLUME INCREASE DUE TO TRIAXIAL STRESSES, by W. E. Dirkes. Final rept., July-Nov 54, on Materials Analysis and Evaluation Techniwues. Jan 56, 17p. WADC Technical rept. 54-391, Supplement 1; AD-92 961.

DESCRIPTOES: *Heat resistant metals and alloys, *Chromium alloys, *Nickel alloys, *Cobalt alloys, *Iron alloys, Volume, *Rupture, *Shear stresses, High temperature research.

The volume of structural metals is generally considered to remain constant even with extremely high stresses applied. Some data recently published indicate significant changes in volume under stress-rupture test conditions for specimens having stress gradients. More recent analysis of the same data and specimens together with additional measurements from these specimens show that significant volume changes did not actually occur, but that plane cross-sections of specimens did not always remain plane when subjected to stress gradients. (Author)

AD-403 074 repriced OTS $1.50

Materials Research Corp., Orangeburg, N. Y.
THE MECHANICAL PROPERTIES OF TANTALUM WITH SPECIAL REFERENCE TO THE DUCTILE-BRITTLE TRANSITION, by G. T. Murray and R. A. Burn. Final rept., 1 Apr 61-1 Apr 62, on Metallic Materials, Contract AF 33(616)7173. Mar 63, 54p. 14 refs. ASD TR 61-203, Pt. II; NASA N63-15715.

DESCRIPTORS: *Tantalum, Equations, Impurities, Oxygen, Carbon, Stresses, Crystal lattice defects, Microstructure, Fracture (Mechanics), Temperature, Grain structure (Metallurgy), Shear stresses, Tensile properties, Low temperature research, Cryogenics, Brittleness, Ductility, Mathematical models, Transition temperature.

The lower yield stress-grain size relationship was studied in tantalum for two compositions; one consisting of a total interstitial content of 72 ppm with the major constituent being oxygen, and the other containing primarily carbon (116 ppm) in which part of the carbon existed in the form of a finely dispersed carbide precipitate. The carbon containing material showed the lowest yield stresses primarily because of its lower oxygen content. It was concluded that oxygen is much more effective than carbon in restricting dislocation movement. The effect of the carbide precipitate was to increase the work-hardening rate. The flow stresses, however, even in the presence of the carbide phase were lower than those observed for commercial tantalum. (Author)

PB 163 270-1 OTS $2.60

Naval Ordnance Test Station, China Lake, Calif.
TENSILE PROPERTIES OF METALS WHILE BEING HEATED AT HIGH RATES, by W. K. Smith, W. O. Wetmore, and C. C. Woolsey, Jr. 7 Sep 49, 26p. 3 refs. NAVORD rept. 1178, Part 1; NOTS 234.

DESCRIPTORS: *Metals, *Tensile properties, *High-temperature research, Test equipment, Test methods, *Thermal stresses, Thermocouples, Oscillographs, Errors, Experimental data, *Steel, Metallurgy.

This report describes the equipment and method developed for determining tensile properties of metals when subjected to a constant stress and heated at rates comparable to those encountered in rockets. Stresses up to the ambient-temperature yield strength and heating rates up to 3500°F per second were investigated. Test data are presented for SAE 1020 and SAE 4140 steels. These data indicate that design stresses higher than those given by standard short-time high-temperature data may be used where a part must withstand a stress for a short time while its temperature is rapidly increasing. They also indicate that the improvement in tensile properties of steel caused by either work hardening or heat treatment could be utilized under these conditions of loading and heating. (Author)

PB 163 270-2 OTS $1.60

Naval Ordnance Test Station, China Lake, Calif.
TENSILE PROPERTIES OF METALS WHILE BEING HEATED AT HIGH RATES. PART 2. ALUMINUM ALLOYS, by W. K. Smith, C. C. Woolsey, Jr. and W. O. Wetmore. 1 Sep 50, 16p. 3 refs. NAVORD rept. 1178, Part 2; NOTS 319.

DESCRIPTORS: *Metals, *Tensile properties, *Thermal stresses, *High-temperature research, *Aluminum alloys, Metallurgy.

Tensile properties, determined under conditions of loading and heating encountered in the firing of a rocket, are given for the three aluminum alloys, 14S-T6, 24S-T4, and 75S-T6. As has been found with

all metals investigated, higher design stresses are indicated for these conditions than are dictated by standard short-time high-temperature data. An application of these results to the evaluation of materials for a rocket motor tube is described. (Author) (See also PB 163 270-1)

PB 163 270-3 OTS $2.60

Naval Ordnance Test Station, China Lake, Calif.
TENSILE PROPERTIES OF METALS WHILE BEING HEATED AT HIGH RATES. PART 3. COMPARISON OF RESULTS FROM HIGH-HEATING-RATE TESTS WITH RESULTS FROM ROCKET FIRING TESTS, by W. K. Smith, C. C. Woolsey, Jr., and W. O. Wetmore, 20 Dec 50, 24p. 4 refs. NAVORD rept. 1178, Part 3; NOTS 336.

DESCRIPTORS: *Metals, *Tensile properties, *High-temperature research, *Thermal stresses, Correlation techniques, Rocket research, Test vehicles, Metallurgy.

An investigation has been conducted to compare the results of tests made on the same materials by the high-heating-rate method developed at the Naval Ordnance Test Station and by rocket firing tests carried out by the Aerojet Engineering Corporation. Reasonable agreement between the two methods indicates the validity of the high-heating-rate method for the conditions encountered in the firing of a rocket. (Author) (See also PB 163 270-2)

PB 162 911 Available on loan from OTS

New England Materials Lab., Inc., Medford, Mass.
HARD PARTICLE STRENGTHENING OF REFRACTORY METALS FOR HIGH TEMPERATURE USE THROUGH INTERNAL OXIDATION, by A. S. Bufferd, K. M. Zwilsky, and N. J. Grant. Progress rept. no. 2, 1 Sep-31 Oct 59, on Contract NOas 59-6223-c. 5 Nov 59, 4p. AD-230 220.

DESCRIPTORS: *Heat resistant metals and alloys, *Oxidation, *Molybdenum alloys, Titanium alloys, *Dispersion hardening, Heat treatment, Mechanical properties, Nickel, Nickel compounds, Oxides

An investigation was begun to determine the feasibility and the optimum experimental conditions necessary to despersion harden Mo-base alloys by the technique of internal oxidation. A series of tests were made to oxidize solid samples of Mo-0.5% Ti alloys by heating the sample together with a mixture of Ni-NiO powders in a vacuum (10_{μ}) at 1800°F for 2 and 22 hr. A 140-hr trial was made with the vacuum pump shut off when the furnace stabilized at 1800°F. The samples kept under vacuum (10_{μ}) increased slightly in weight while the sample treated for 140 hr had an appreciable decrease in weight. A sample heated at 700°F for 20 hr with preheated air at 225°F had a greater weight increase than the samples treated at 1800°F with Ni-NiO or a sample treated at 700° with air at room temperature. (DDC abstract) (See also PB 162 910)

ORNL-2065 OTS $1.60

Oak Ridge National Lab., Tenn.
HIGH-THERMAL-CONDUCTIVITY FIN MATERIAL FOR RADIATORS, by H. Inouye. Rept. for Nov 52-Aug 54 on Contract W-7405-eng-26. 24 Jan 57, 20p.

IDO-14606 OTS $0.75

Phillips Petroleum Co., Idaho Falls.
EFFECT OF ALLOYING CONSTITUENTS ON ALUMINUM DISSOLUTION RATES, by R. D. Fletcher, M. E. Jacobson, and H. R. Beard. Rept. on Contract AT(10-1)205. 15 Apr 63, 31p. 4 refs. NASA N63-16899.

TID-17887 OTS $2.00

Southern Research Inst., Birmingham, Ala.
THE TRUE STRESS-STRAIN PROPERTIES OF BRITTLE MATERIALS TO VERY HIGH TEMPERATURES. Final rept. for 1961-1962 on Contract AT(40-1)2694. 27 Oct 62, 87p. 5511-1190-XXIV; NASA N63-14498.

NASA N63-14289 OTS $2.60

William Marsh Rice U., Houston, Tex.
LOW TEMPERATURE INTERNAL FRICTION IN GOLD AND COPPER, by S. Okuda. Rept. on Grant NsG-6-59. [1962] 22p. 12 refs.

Ferrous Metals

NAA-SR-6246 OTS $0.75

Atomics International, Canoga Park, Calif.
CARBURIZATION OF AUSTENITIC STAINLESS STEEL BY URANIUM CARBIDES IN SODIUM SYSTEMS by B. A. Webb. Rept. on Contract AT(11-1)GEN-8. 31 May 63, 32p. 5 refs.

TID-17917 OTS $1.60

Colorado School of Mines, Golden.
METALLURGICAL PROPERTIES OF KETOS AND CRESCENT TOOL STEELS, by Richard G. Hoagland. Rept. on Contract AT(11-1)1173. 20p.

Structural Metallurgy and Corrosion

NAA-SR-7755 OTS $0.75

Atomics International, Canoga Park, Calif.
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CHEMISTRY DIVISION ANNUAL REPORT, 1962. Rept. on Contract W7405-eng-48. Jan 63, 348p. NASA N63-16538.

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ENERGY DEPENDENCE DETERMINATIONS IN THE 60-180 KEV RANGE WITH AN X-RAY MACHINE OF VARYING OUTPUT, by Arthur Shambon, Albert Zila, and Robert Sanna. Feb 63, 30p. 9 refs. NASA N63-16850.

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Linear Accelerator Lab., U. of Minnesota, Minneapolis.
ANNUAL PROGRESS REPORT FOR PERIOD DECEMBER 1961 - NOVEMBER 1962 [ON LINEAR ACCELERATOR]. Rept. on Contract AT(11-1)50. Nov 62, 136p.

PB 163 251 OTS $1.60

Materials Lab. [Aeronautical Systems Div.] Wright-Patterson AFB, Ohio.
THE DESIGN OF LEAD CELLS FOR THE STORAGE OF RADIOISOTOPES, by B. A. Raby. Apr 56, 16p. WADC Technical note 56-180.

DESCRIPTORS: *Radioactive isotopes, Storage, *Shielding, *Lead, *Containers, Design.

Details of design and fabrication for lead cells, which are intended for storing radioactive materials, are described in this report. This facility is used for the storage of moderate quantities of activities. The Appendix is composed of drawings and photographs which graphically illustrate the facility. The cells have been used successfully for several months. (Author)

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Nepa Div., Fairchild Engine and Airplane Corp., Oak Ridge, Tenn.
SCINTILLATION COUNTING, by Joe K. Bair. 16 Mar 51, 82p. 8 refs. Rept. no. NEPA 1645.

DESCRIPTORS: *Radiation measurement systems, *Scintillation counters, *Neutron detectors, *Gamma ray spectroscopy, *Crystal counters, Crystals, *Anthracenes, *Cadmium compounds, Tungstates, *Sodium compounds, *Thallium compounds, *Lithium compounds, Iodides, Piezoelectric crystals, Fast neutrons, Gamma rays.

The work was directed towards determining the feasibility of using the relatively new scintillation-counting techniques for such purposes as were of interest and value to the NEPA Project. The work covers the successful use of such crystals as anthracene, cadmium tungstate, and sodium iodide plus thallium iodide. An attempt was made to find a lithium-containing crystal which would count satisfactorily; such work includes an attempt by the NEPA Chemistry Group to grow large, clear crystals of lithium iodide. Natural and synthetic lithium-containing minerals were tested when they could be obtained. Certain piezoelectric crystals were tried unsuccessfully. Counting methods tried consisted of P. R. Bell's single-crystal technique; Hofstadter's two-crystal technique, with improvements developed locally; Hofstadter's suggested three-crystal pair spectrometer; and an original version of this designed to remove pair peaks and give only Compton peaks.

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Stanford U., Calif.
LINEAR ELECTRON ACCELERATOR STUDIES. Status rept. 1 Oct-31 Dec 58, on Contract AT(04-3)21. Feb 59, 47p. M. L. rept. no. 581.

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ARMY GAS-COOLED REACTOR SYSTEMS PROGRAM. Monthly progress rept. for July 62 on Contract AT(10-1)880. 17 Aug 62, 75p.

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Allis-Chalmers Mfg. Co., Washington, D. C.
SM-1A CORE II ZERO POWER EXPERIMENT, by L. D. Walthousen, T. M. Raby, and F. G. Moote, Rept. on Contract AT(30-1)2639. 21 Jan 63, 54p.

ANL-6717 $2.00

Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM. Progress rept. for Apr 63 on Contract W31-109-eng-38. 15 May 63, 83p. 27 refs. NASA N63-16179.

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SINTERING AND PROPERTIES OF URANIUM AND THORIUM MONOSULFIDES, by P. D. Shalek and J. H. Handwerk. Rept. on Contract W-31-109-eng-38. 8 Oct 62, 18p. UAC-6948.

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Atomic Energy Commission. Div. of Licensing and Regulation, Washington, D. C.
A SURVEY OF 21 REACTOR VESSELS IN LIGHT OF THE ANTICIPATED EFFECTS OF NEUTRON IRRADIATION ON THE BRITTLE-RUPTURE PROPERTIES OF MATERIALS OF CONSTRUCTION, by A. B. Holt. [1962] 15 Mar 63, 100p. 19 refs. NASA N63-14630.

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Atomic Energy Commission. Div. of Research, Washington, D. C.
RESEARCH REACTOR FUEL ELEMENT CONFERENCE, GATLINBURG, TENNESSEE, SEPTEMBER 17-19, 1962. 1963, 738p. Prepared in cooperation with Oak Ridge National Lab. and Atomic Energy Commission. Div. of Reactor Development; NASA N63-16118.

NAA-SR-5947 OTS $1.00

Atomics International, Canoga Park, Calif.
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Bettis Atomic Power Lab., Pittsburgh, Pa.
BETTIS TECHNICAL REVIEW. REACTOR TECHNOLOGY. Rept. on Contract AT(11-1)GEN-14. Mar 63, 79p. 3 refs. NASA N63-15261; includes NASA N63-(15262-15267)

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TIME-DEPENDENT FISSION-PRODUCT POISONS IN U-235 AND NATURAL URANIUM FUELS, by M. R. Stuart and T. R. England. Rept. on Contract AT(11-1)GEN-14. Oct 62, 12p.

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Chicago Operations Office, Atomic Energy Commission, Ill.
PROCEEDINGS OF THE NUCLEAR SUPERHEAT MEETING, NO. 7, SEPTEMBER 12-14, 1962, SIOUX FALLS, SOUTH DAKOTA. 30 Oct 62, 201p. 158 refs. COO-266; NASA N63-15502.

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Combustion Engineering, Inc., Windsor, Conn.
STUDIES ON LOW ENRICHED CORES CONTAINING SIMPLE NUCLEAR SUPERHEAT ELEMENTS. PART I. CRITICAL EXPERIMENTS, by J. S. Crudele, C. O. Dechand and others. Rept. on Contract AT(11-1)795. 1 Feb 61, 38p.

NYO-10474 OTS $4.60

Dynatech Corp., Cambridge, Mass.
SYSTEM STABILITY OF A SIMULATED BOILING WATER REACTOR WITH EXIT STEAM QUALITY CONTROL, by D. A. Gall, E. F. Doyle and others. Topical rept. no. 6 on Contract AT(30-1)2907. Nov 62, 43p. Rept. no. 348.

TID-17538 OTS $1.10

Engineering Research Labs., Columbia U., New York.
BASIC EXPERIMENTAL STUDIES OF BOILING FLUID FLOW AND HEAT TRANSFER AT ELEVATED PRESSURES, by Bruce Matzner. Monthly progress rept., Nov 62, on Contract AT(30-3)187. 30 Nov 62, 10p.

GA-3676 OTS $1.25

General Atomic Div., General Dynamics Corp., San Diego, Calif.
40-MW(E) PROTOTYPE HIGH-TEMPERATURE GAS-COOLED REACTOR RESEARCH AND DEVELOPMENT PROGRAM. Quarterly progress rept. for period ending 30 Sep 62 on Contract AT(04-3)314. 15 Apr 63, 53p. 14 refs. NASA N63-16418.

GAMD-3378 OTS $2.60

General Atomic Div., General Dynamics Corp., San Diego, Calif.
HTGR IN-PILE LOOP EXPERIMENT ACTIVITY ANALYSIS GAIL III-A FUEL ELEMENT, by D. R. Lofing and L. R. Zumwalt. Rept. on Contract AT(04-3)314. 28 Sept 62, 29p.

GEMP-177A OTS $3.00

General Electric Co., Cincinnati, Ohio.
HIGH-TEMPERATURE MATERIALS AND REACTOR COMPONENT DEVELOPMENT PROGRAMS. VOLUME I. MATERIALS. Annual rept. no. 2 on Contract AT(40-1)2847. 28 Feb 63, 199p. 41 refs. NASA N63-15756.

GEAP-4162 OTS $0.50

General Electric Co., San Jose, Calif.
DEVELOPMENT OF PULSED NEUTRON APPLICATION TO POWER REACTOR START-UP PROCEDURES, by Edward Garelis and Paul Meyer. Quarterly progress rept. no. 3, 1 Oct-31 Dec 62 on Contract AT(04-3)189. 7 Jan 63, 8p.

GEAP-4146 OTS $1.75

General Electric Co., San Jose, Calif.
EVESR-NUCLEAR SUPERHEAT FUEL DEVELOPMENT PROJECT, by R. T. Pennington. Quarterly rept. no. 2, Sep-Nov 62 on Contract AT(04-3)189. Dec 62, 67p.

APED-3958 OTS $26.00

General Electric Co., San Jose, Calif.
FINAL HAZARDS SUMMARY REPORT FOR THE ESADA VALLECITOS EXPERIMENTAL SUPERHEAT REACTOR, ed. by J. L. Murray. 1 Oct 62, 574p. Prepared in cooperation with Niagara Mohawk Power Corp., includes GEAP-3643.

GEAP-4049 OTS $4.60

General Electric Co., San Jose, Calif.
HIGH POWER DENSITY DEVELOPMENT PROJECT, by R. L. Holladay. Quarterly progress rept. no. 9, Apr-June 62, on Contract AT(04-3)361. 1 July 62, 49p.

GEAP-3940 OTS $1.00

General Electric Co., San Jose, Calif.
MULTI-ROD BURNOUT AT HIGH PRESSURE, by E. E. Polomik and E. P. Quinn. Rept. on Contract AT(04-3)361. Sep 62, 44p. 17 refs.

GEAP-4059 OTS $2.25

General Electric Co., San Jose, Calif.
VIBRATION OF FUEL RODS IN PARALLEL FLOW, by E. P. Quinn. Rept. on Contract AT(04-3)361. July 62, 101p. 9 refs.

TID-17530 OTS $4.60

Georgia Inst. of Tech. Engineering Experiment Station, Atlanta, Ga.
MATERIALS FOR HIGH TEMPERATURE NUCLEAR ENGINEERING APPLICATIONS, by J. D. Fleming, J. W. Johnson and others. Quarterly rept. no. 2, 1 July-1 Oct 62, on Contract AT(40-1)2483. 44p.

HW-SA-1821 OTS $3.60

Hanford Atomic Products Operation, Richland, Wash.
AUTOMATIC CLADDING THICKNESS AND BONDING TESTER FOR REACTOR FUEL ELEMENTS, by D. O. Hunter. Rept. on Contract AT(45-1)1350. 4 Nov 59, 33p.

HW-56938 OTS $2.60

Hanford Atomic Products Operation, Richland, Wash.
CRITICALITY OF HIGHLY ENRICHED U-235 FUELS, by N. Ketzlach. Rept. on Contract AT(45-1)1350. 1958. 21p. 13 refs.

HW-SA-2622 OTS $1.60

Hanford Atomic Products Operation, Richland, Wash.
OPERATING EXPERIENCE IN THE HANFORD PLUTONIUM CRITICAL MASS FACILITY, by R. C. Lloyd, E. D. Clayton, and W. A. Reardon. Rept. on Contract AT(45-1)1350. 8 May 62, 16p. 7 refs.

HW-75135 OTS $2.60

Hanford Atomic Products Operation, Richland, Wash.
ZIRCALOY-2 TO CARBON STEEL EXPANDED JOINT N-REACTOR PROCESS TUBE FITTING, by J. H. Fastabend. Rept. on Contract AT(45-1)1350. 31 Dec 62, 24p.

TID-17391 OTS $2.60

Knolls Atomic Power Lab., Schenectady, N. Y.
THE USE OF SUBCRITICAL ASSEMBLIES FOR STUDYING REACTOR PARAMETERS, by David R. Bach. Rept on Contract W-31-109-eng-52. 27 Oct 62. 30p.

NASA N63-15693 OTS $1.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
PERFORMANCE CAPABILITY OF SINGLE-CAVITY VORTEX GASEOUS NUCLEAR ROCKETS, by Robert G. Ragsdale. May 63, 70p. 20 refs. Technical note D-1579.

LAMS-2716 OTS $3.60

Los Alamos Scientific Lab., N. Mex.
HIGH DENSITY W-UO_2 BY ACTIVATED SINTERING, by W. H. Lenz and P. R. Mundinger. Rept. on Contract W7405-eng-36. May 62, 33p. 8 refs.

BRB-66 OTS $4.60

Mallinckrodt Chemical Works, Weldon Spring, Mo.
MANNESMANN ROTARY PIERCING OF URANIUM, by J. A. Fellows, Q. C. Carloni, and L. Lewis. Rept. on Contract AT(30-1)1405, 18 May 62, 41p. Prepared in cooperation with Bridgeport Brass Co.

MND-2903(Vol. I) OTS $3.00

Martin-Marietta Corp., Baltimore, Md.
FEASIBILITY STUDY OF WATER-COOLED THERMIONIC NUCLEAR POWER PLANT. Rept. on Contract AT(30-1)2990. Nov 62, 204p.
NASA N63-16362.

MND-M3A-2452 OTS $8.60

Martin-Marietta Corp., Baltimore, Md.
PM-3A NUCLEAR POWER PLANT PROGRAM. Progress rept. no. 5, 16 Aug 61 - 15 Feb 62, Contract AT(30-1)2700. 98p.

MLM-1140 OTS $2.60

Mound Lab., Miamisburg, Ohio
MOUND LABORATORY PROGRESS REPORT FOR AUGUST 1962, by G. R. Grove, L. V. Jones, and J. F. Eichelberger. Rept. on Contract AT(33-1)GEN-53. 30 Aug 62, 25p.

NLCO-870 OTS $2.00

National Lead Co. of Ohio, Cincinnati.
SUMMARY TECHNICAL REPORT. Rept. for 1 Jan-31 Mar 63 on Contract AT(30-1)1156. 10 May 63, 89p. 5 refs.

NMI-7255 OTS $2.60

Nuclear Metals, Inc., Concord, Mass.
POWER REACTOR PROGRAM, by S. Isserow, R. W. Anderson, and W. L. Larson. Progress rept. 1-30 Sep 62. Rept. on Contract AT(30-1)1565. 31 Oct 62, 29p.

IDO-16833(Rev. 1) OTS $2.75

Phillips Petroleum Co., Idaho Falls.
FEASIBILITY AND CONCEPTUAL DESIGN FOR THE STEP LOSS OF COOLANT FACILITY, by T. R. Wilson O. M. Hauge, and G. B. Matheney. Rept. on Contract AT(10-1)205. 24 Apr 63, 183p. 45 refs.

ORNL-3386 OTS $2.50

Oak Ridge National Lab., Tenn.
ARMY REACTORS PROGRAM ANNUAL PROGRESS REPORT. Rept. for period ending 31 Oct 62 on Contract W7405-eng-26. 10 Apr 63, 124p. 20 refs.

ORNL-TM-395 OTS $1.60

Oak Ridge National Lab., Tenn.
CONTINUOUS DISSOLUTION OF ZIRCONIUM REACTOR FUELS IN TITANIUM EQUIPMENT: LABORATORY DEMONSTRATION, by T. A. Gens. Rept. on Contract W-7405-eng-26. 23 Jan 63, 16p.

ORNL-TM-433 OTS $1.10

Oak Ridge National Lab., Tenn.
NEUTRON MULTIPLICATION BY EXPERIMENTAL GAS COOLED REACTOR FUEL ASSEMBLIES, by E. B. Johnson and R. K. Reedy, Jr. Rept. on Contract W-7405-eng-26. 27 Nov 62, 6p.

ORNL-TM-460 OTS $3.60

Oak Ridge National Lab., Tenn.
A PRELIMINARY EXAMINATION OF THE FORMATION AND UTILIZATION OF TEXTURE AND ANISOTROPY IN ZIRCALOY-2, by M. L. Picklesimer. Rept. on Contract W-7405-eng-26. 28 Feb 63, 31p.

ORNL-TM-470 OTS $1.60

Oak Ridge National Lab., Tenn.
PROMPT NEUTRON DECAY IN A TWO-COMPONENT ENRICHED URANIUM METAL CRITICAL ASSEMBLY, by J. T. Mihalczo. Rept. on Contract W-7405-eng-26. 11 Jan 63, 13p.

ORNL-3208 OTS $2.75

Oak Ridge National Lab., Tenn.
STEAM GENERATORS FOR HIGH-TEMPERATURE GAS-COOLED REACTORS, by A. P. Fraas and M. N. Ozisik. Rept. on Contract W7405-eng-26. 1963. 178p. 11 refs.

ORNL-TM-446 OTS $2.60

Oak Ridge National Lab., Tenn.
A TECHNIQUE FOR THE QUANTITATIVE CHARACTERIZATION OF DISPERSIONS, by J. H. Cherubini and Sigfred Peterson. Rept. on Contract W-7405-eng-26. 28 Feb 63, 25p.

ORNL-2056 OTS $4.60

Oak Ridge National Lab., Tenn.
THOREX THORIUM NITRATE PRODUCT SPECIFICATIONS, by E. D. Arnold and R. P. Wischow. Rept. on Contract W-7405-eng-26. 24 May 56. 41p.

IDO-16827 OTS $1.50

Phillips Petroleum Co., Idaho, Falls.
MATERIALS TESTING REACTOR-ENGINEERING TEST REACTOR TECHNICAL BRANCHES. Quarterly rept. 1 July-30 Sep 62, on Contract AT(10-1)205. 15 Jan 63, 60p. 39 refs.

IDO-16857 OTS $1.75

Phillips Petroleum Co., Idaho Falls.
MATERIALS TESTING REACTOR-ENGINEERING TEST REACTOR TECHNICAL BRANCHES. Quarterly rept. 1 Oct-31 Dec 62, on Contract AT(10-1)205. 29 Mar 63, 69p. 30 refs. NASA N63-16517.

IDO-16768 OTS $1.00

Phillips Petroleum Co., Idaho Falls.
TRANSIENT TESTS OF THE BSR-II CORE IN THE SPERT I FACILITY, by L. A. Stephan. Rept. on Contract AT(10-1)205. 5 Apr 63, 43p. 16 refs.

PRDC-TR-60 OTS $1.60

Power Reactor Development Co., Detroit, Mich.
MONTHLY TECHNICAL REPORT (ON APDA ACTIVITIES FOR) JUNE 1962, Rept. on Contract AT(11-1)476. 19p.

PWAC-161 OTS $8.10

Pratt and Whitney Aircraft Div., United Aircraft Corp., East Hartford, Conn.
NUCLEAR ENGINEERING PROGRAM, Topical Report No. 1, 1 July 55-30 June 56, on Contracts AF 33(038)27341 and AT(11-1)229, 82p.

PWAC-89 OTS $2.60

Pratt and Whitney Aircraft Div., United Aircraft Corp., East Hartford, Conn.
REACTOR AND SHIELD WEIGHTS FOR THE CFRMR, by Charles F. deGanahl. Rept. on Contract AT(21-1)229. 31 Dec 53, 21p. FXM-621.

PWAC-100 OTS $5.60

Pratt and Whitney Aircraft Div., United Aircraft Corp , East Hartford, Conn.
SUPERCRITICAL WATER REACTOR SHIELD DESIGN PROCEDURE, by C. F. deGanahl, H. Woodsum, and H. V. Garabedian. Rept. on Contract AT(11-1)229, 1 June 54, 59p.

PWAC-186 OTS $16.50

Pratt and Whitney Aircraft Div., United Aircraft Corp., Middletown, Conn.
CORE-MODERATED CIRCULATING FUEL REACTOR STUDY. Rept. on Contract AT(11-1)229. 15 July 57, 254p.

PWAC-189(Vol.2) OTS $15.50

Pratt and Whitney Aircraft Div., United Aircraft Corp., Middletown, Conn.
THE P&WA CIRCULATING FUEL REFLECTOR-MODERATOR REACTOR. VOLUME 2. APPENDIX A: DESIGN SPECIFICATIONS AND REFERENCE INFORMATION FOR THE PWAR-6; FLYING TEST BED APPLICATION, by C. C. Bigelow and M. E. Greenstreet. Rept. on Contract AT(11-1)229. 15 Nov 57, 234p.

TID-17473 OTS $8.60

Tennessee U., Knoxville.
PROGRAMMING THE GENERALIZED ONE DIMENSIONAL DIFFUSION EQUATION SPACE SIMULATOR AND SIMULATION OF THE SHIPPINGPORT PRESSURIZED WATER REACTOR, by James Conda Robinson, Aug 61, 93p.

NAA-SR-6307 OTS $9.10

Thompson Ramo Wooldridge Inc., Cleveland, Ohio.
THE SNAP II POWER CONVERSION SYSTEM TOPICAL REPORT NO. 15. CRU DESIGN AND DEVELOPMENT. Rept. on Contract AT(11-1)GEN-8. Oct 62, 102p. 2 refs. TRW rept. no. ER-4108; NASA N63-10588.

GEAP-3918 OTS $2.00

Vallecitos Atomic Lab., General Electric Co., San Jose, Calif.
FABRICATION OF FUEL ELEMENTS BY SWAGING, by E. A. Lees. Rept. on Contract AT(04-3)361. 21 May 62. 84p. 5 refs.

GEAP-4028 OTS $0.75

Vallecitos Atomic Lab., General Electric Co., San Jose, Calif.
A FUEL REPROCESSING PLANT FOR FAST CERAMIC REACTORS, by H. W. Alter. Rept. on Contract AT(04-3)189. 1 Feb 62, 28p. 5 refs.

WCAP-4128 OTS $1.10

Westinghouse Electric Corp., Pittsburgh, Pa.
CAROLINAS VIRGINIA NUCLEAR POWER ASSOCIATES, INC. CVTR PROJECT MONTHLY PROGRESS REPORT, AUGUST 1962. Rept. on Contract AT(30-1)2289. 7p.

CVNA-144 OTS $5.60

Westinghouse Electric Corp., Pittsburgh, Pa.
IMPULSE BURST TESTING ON ZIRCALOY-4 PRESSURE TUBE, by E. A. Davis and G. H. Eng. Topical rept. on Contract AT(30-1)2289. June 62, 51p.

Nuclear Reactions

PB 163 295 OTS $5.60

Bartol Research Foundation, Swarthmore, Pa.
SEMI-ANNUAL REPORT, by C. E. Mandeville. Rept. for 1 Feb-30 June 53, on Contract Nonr-436(00). 30 July 53, 51p. 14 refs. AD-16 225.

DESCRIPTORS: *Nuclear reactions, Nuclear scattering, *Inelastic scattering, *Neutron scattering, Neutron detectors, Geometric forms, Wedges, *Gamma-ray scattering, Scintillation counters, Gamma counters, *Nuclear cross sections, Neutron cross sections, *Elastic scattering, Distribution, *Radiation measurement systems, Iron, Chromium, Bismuth, Lead, Aluminum.

Contents:
Inelastic scattering: Neutrons; Gamma rays
Total cross sections; angular distribution of elastic scattering; inelastic cross sections.

UCRL-9898 OTS $2.50

Lawrence Radiation Lab., U. of California, Berkeley.
ENERGY AND ANGULAR DISTRIBUTIONS OF (α, α') AND (d, α) REACTIONS, by George Merkel. Doctoral thesis. Rept. on Contract W7405-eng-48. 1 Nov 61, 119p. 38 refs.

NYO-10252 OTS $2.60

Rochester U., N. Y.
A STUDY OF THE REACTION MECHANISM OF THE C^{13}(d, n) N^{14} AND C^{13}(d, p)C^{14} REACTION BETWEEN 3.2 AND 4.1 Mev, by V. K. Deshpande. Rept. on Contract AT(30-1)875. 17 Dec 62, 26p. NASA N63-13321.

Radioactivity

TID-12616(Rev. 1) OTS $1.00

Atomic Energy Commission. Div. of Biology and Medicine, Washington, D. C.
ATMOSPHERIC RADIOACTIVITY AND FALLOUT RESEARCH. Dec 62, 99p. 27 refs.

CEX-58.4.8 OTS $1.25

Geological Survey, Washington, D. C.
AERORADIOACTIVITY SURVEY AND AREAL GEOLOGY OF THE GEORGIA NUCLEAR LABORATORY AREA, NORTHERN GEORGIA (ARMS-I) by Jules A. MacKallor. Jan 62, 36p. 30 refs. Prepared in cooperation with Atomic Energy Commission. Div. of Biology and Medicine; NASA N63-16961

HW-77296 OTS $0.50

Hanford Atomic Products Operation, Richland, Wash.
THE HALF-LIFE OF PROMETHIUM-147, by F. P. Roberts, E. J. Wheelwright, and W. Y. Matsumoto. Rept. on Contract AT(45-1)1350. Apr 63, 6p. 8 refs.

NYO-9533 OTS $5.60

Isotopes, Inc., Westwood, N. J.
STUDIES OF NUCLEAR DEBRIS IN PRECIPITATION, by Alan Walton and Micah W. M. Leo. Rept. on Contract AT(30-1)2415. 15 Nov 62, 55p.

PHYSICS

LADC-5532 OTS $1.60

Los Alamos Scientific Lab., N. Mex.
CRYOGENICS AND SUPERCONDUCTORS, by E. F. Hammel. Rept. on Contract W-7405-eng-36. [1962] 19p.

LAMS-2624 OTS $1.10

Los Alamos Scientific Lab., N. Mex.
ELECTROMAGNETIC SIGNAL FROM A BOMB BURST IN VACUO, by B. R. Suydam. Rept. on Contract W7405-eng-36. 3 Nov 61, 10p.

AD-403 498 repriced OTS $2.25

Monsanto Research Corp., Dayton, Ohio.
FLAME SPEED DATA REDUCTION AND CORRELATION USING A DIGITAL COMPUTER, by G. H. Ringrose, D. R. Miller and others. Final rept. on a Research Program for Understanding the Mechanisms of Flame Inhibition, Flight Vehicle Hazard Protection, and Non-Metallic and Composite Materials, Contracts AF 33(616)7757, AF 33(657)7617, and AF 33(616)7458. Feb 63, 89p. 6 refs. ASD-TDR-63-182; NASA N63-16360.

DESCRIPTORS: *Combustion, Flames, Measurement, *Digital computers, *Programming (Computers), Linear systems, Inhibition, *Flame propagation, Correlation techniques, Data processing systems, Velocity.

Two digital computer routines were developed to process flame speed data resulting from the burning of compounds in air and oxygen, and to correlate particular structural configuration with flame speed. In both routines a high degree of flexibility has been incorporated to assure efficient utilization under several foreseeable circumstances. The first routine, FSC, processes the raw experimental data to obtain flame speeds, equivalence ratios, and the equivalence ratio at the maximum flame speed. This information is stored on a master magnetic tape for subsequent calculations. The second routine, FSR, permits selection of specific data groups from the master tape for analysis. A linear model was chosen for the correlation. (Author)

NASA N63-15566 OTS $1.60

National Bureau of Standards, Washington, D. C.
TRANSMISSION AND REFLECTION OF ELECTRONS BY ALUMINUM FOILS, by Martin J. Berger. Rept. on NASA Contract R-80. 1 Apr 63, 15p. 3 refs. NBS-TN-187.

ORNL-TM-422 OTS $2.60

Oak Ridge National Lab., Tenn.
A MONTE CARLO CALCULATION OF THE THREE-DIMENSIONAL DEVELOPMENT OF HIGH-ENERGY ELECTRON-PHOTON CASCADE SHOWERS, by C. D. Zerby and H. S. Moran. Rept. on Contract W-7405-eng-26. 3 Dec 62, 26p.

AD-289 199 OTS $9.10

Wayne State U., Detroit, Mich.
DETERMINATION BY SCATTERING SPECTRA OF PARTICLE SIZE DISTRIBUTION CURVES IN EMULSIONS AND COAGULATING LATICES, by Rodney T. Wu. Technical rept. no. 1(47) on Contract Nonr-3511(00). 15 June 62, 110p. 61 refs.

DESCRIPTORS: *Spectrographic analysis, *Particles, Distribution theory, *Colloids, Lattices, Fluid flow, Scattering.

The principles of a method are reviewed by which the size distribution in an emulsion can be approximated satisfactorily. The method is based on the assumption that the emulsions follow a general type of distribution in which the number of particles below a certain size can be neglected and there is a trailing off in number towards larger particle sizes. The method is tested experimentally on all emulsion series to study the effect of emulsifier concentration and aging upon size distribution. The same method is also applied to study the variation of particle size distribution with the progress of a slowly coagulating latex system. A scheme is proposed so that the effective concentration of an emulsion can be determined. The emulsifier content in an emulsion has little effect upon the size of the smallest particles as long as it is present in sufficient amount to stabilize the emulsion. On the other hand, the distribution becomes narrower with the increasing concentration of the emulsifier.

Electricity and Magnetism

IS-622 OTS $1.10

Ames Lab., Iowa State U. of Science and Tech.
MAGNETOSTRICTION IN Dy AND Ho, by S. Legvold, J. Alstad, and J. Rhyne. Rept. on Contract W-7405-eng-82. 15 Feb 63, 7p.

AD-277 378 repriced OTS $2.75

General Electric Research Lab., Schenectady, N. Y.
RESEARCH AND DEVELOPMENT ON CORONA-RESISTANT MATERIALS, by J. C. Devins, H. L. Greenhaus and others. Rept. for 15 June-15 Oct 61, on Electronic and Magnetic Materials, Contract AF 33(616)7485. Mar 62, 135p. 39 refs. ASD Technical rept. 61-693; NASA N62-15515.

DESCRIPTORS: *Electric discharges, *Insulating materials, *Electric insulation, Ions, Plastics, Varnishes, Fluorocarbons, Glass.

The shapes of individual corona pulses and the changes in the shape with the applied voltage were determined. It was found that as the overvoltage increased the pulses change from a type characteristic of corona avalanches to one characteristic of streamer discharge. The change was interpreted theoretically by consideration of the positive ion space charge produced in the early stages of the discharge. The chemical reactions were studied in detail on polyethylene. On other insulation materials the gross reactions have been studied with an eye to a broad general method of testing. (Author)

NASA N63-16990 OTS $0.50

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
ON THE BREAKDOWN VOLTAGES OF SOME ELECTRONEGATIVE GASES AT LOW PRESSURES, by Stefan Schreier. June 63, 11p. 15 refs. NASA TN D-1761.

NASA N63-15259 OTS $10.10

Liquid Metals, Inc., Westford, Mass.
RESEARCH ON FUNDAMENTAL ELECTRODYNAMIC AND HYDRODYNAMIC PHENOMENA INVOLVED IN ELECTROMAGNETIC PUMPING OF LIQUID METALS, by G. F. Findlay. Final rept. 15 Mar 61-31 Mar 62, on Contract NASr-33. [1962] 123p.

LA-2853 OTS $2.75

Los Alamos Scientific Lab., N. Mex.
NET-1 NETWORK ANALYSIS PROGRAM, by Allan F. Malmberg and Fred L. Cornwell. Rept. on Contract W7405-eng-36. 4 Mar 63, 154p. 3 refs. NASA N63-16522.

TID-17915 OTS $1.60

Sandia Corp., Albuquerque, N. Mex.
THE FERROELECTRIC-ANTIFERROELECTRIC TRANSITION AND DIELECTRIC PROPERTIES IN THE TERNARY SYSTEM $PbZrO_3$-$PbHfO_3$-$PbTiO_3$, by Charles A. Hall and Ralph L. Cook. Rept. on Contract AT(29-1)789. Jan 63, 16p. SCDC-2985.

Electronics

TID-17475 OTS $7.60

California U., La Jolla.
PLASMA PHYSICS RESEARCH (THEORETICAL), by Marshall N. Rosenbluth. Progress rept. on Contract AT(11-1)34. Oct 62, 73p.

NASA N63-16163 OTS $0.50

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
ION SHEATH EFFECTS NEAR ANTENNAS RADIATION WITHIN THE IONOSPHERE, by H. A. Whale. May 63, 16p. 8 refs. Technical note D-1746.

NASA N63-16711 OTS $1.50

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
DISPERSION AND DAMPING OF LONGITUDINAL ELECTRON OSCILLATIONS IN THERMAL PLASMAS, by James F. Morris. June 1963, 58p. 25 refs. Technical note no. D-1734.

TID-17888 OTS $2.60

New York U., N. Y.
THE USE OF ATOMIC BEAMS AS A PROBE FOR STUDYING LOW DENSITY PLASMAS, by Benjamin Bederson. Quarterly progress rept., 1 Oct-31 Dec 62, on Contract AT(30-1)2397. 1 Jan 63, 24p.

PB 163 280 OTS $3.60

Pitman-Dunn Labs., Frankford Arsenal, Philadelphia, Pa.
THE QUALITY FACTOR, Q, OF SUPERCONDUCTING CAVITIES AT HIGH FREQUENCIES, by F. Rothwarf. Nov 60, 36p. 35 refs. Rept. no. R-1574; AD-249 823.

DESCRIPTORS: *Cryogenics, *Microwave equipment, Cavity resonators, *Superconductors, Electrical properties, Superconductivity, Surface properties, Microwaves, Storage tubes.

A review is made of the recent experiment and theoretical studies concerning the properties of superconductors at high frequencies. This survey was made in order to determine the maximum Q's that might be expected for superconducting microwave cavities. Calculations based upon the Bardeen-Cooper-Schrieffer (BCS) theory of superconductivity indicate that extremely high Q's are possible at temperatures below 0.3 T and at frequencies less than 3.52 kT/h. However, all experiments on superconductors at microwave frequencies, though displaying excellent agreement with the Mattis-Bardeen-Miller calculations of surface impedance, exhibit a frequency-dependent residual surface resistance near O deg K. The origin of this phenomenon remains obscure. It is this effect that places an upper limit of about 100 million on the maximum Q's attainable with superconducting cavities. Recommendations are made as to some experiments that might help clarify the causes of the residual surface resistance. (Author)

MATT-164 OTS $0.50

Plasma Physics Lab., Princeton U., N. J.
PHENOMENA IN RUNAWAY DOMINATED STELLARATOR DISCHARGES, by Wolfgang Stodiek and Don J. Grove. Rept. on Contract AT(30-1)1238. Dec 62, 11p. 3 refs. NASA N63-12793.

TID-17943 OTS $11.50

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
QUARTERLY PROGRESS REPORT NO. 68 [ON ELECTRONICS], by J. J. Zimmermann, G. G. Harvey, and W. B. Davenport, Jr. Rept. on Contract AT(30-1)1842. 15 Jan 63, 154p.

Molecular Physics and Spectroscopy

NASA N63-16164 OTS $1.75

Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
TABULATED VALUES OF BOND DISSOCIATION ENERGIES, IONIZATION POTENTIALS, AND ELECTRON AFFINITIES FOR SOME MOLECULES FOUND IN HIGH-TEMPERATURE CHEMICAL REACTIONS, by Charles J. Schexnayder, Jr. May 63, 63p. 113 refs. Technical note D-1791.

NASA N63-16290 OTS $2.00

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
FORMULATION AND DIGITAL CODING OF APPROXIMATE HYDROGEN PROPERTIES FOR APPLICATION TO HEAT-TRANSFER AND FLUID-FLOW COMPUTATIONS, by David P. Harry, III. May 63, 73p. 17 refs. Technical note D-1664.

NASA N63-14547 OTS $5.60

Institute for Molecular Physics, U. of Maryland, College Park.
FORMAL KINETIC THEORY OF TRANSPORT PHENOMENA IN POLYATOMIC GAS MIXTURES, by L. Monchick and E. A. Mason. Rept. on Grant NsG-5-59. 1 Apr 63, 59p. 45 refs.

AD-403 492 repriced OTS $0.75

Isomet Corp., Palisades, N. J.
RESEARCH ON A SUITABLE DISPERSING OR ANALYZING CRYSTAL FOR X-RAY SPECTROSCOPY, by Warren Ruderman, Edward Losin, and Dudley Uphoff. Final rept. 15 Dec 61-14 Dec 62, on Contract AF 33(657)7756. Apr 63, 26p. 2 refs. ASD-TDR-63-311.

DESCRIPTORS: *X-ray diffraction analysis, *Crystal growth, Synthesis, Solutions, Powders, Diffraction analysis, Crystal structure, Single crystals, Organic compounds, Reflection, Spectroscopy, Spectrum

analyzers, Instrumentation, Laboratory equipment, Fluorescence, X-ray spectroscopy.

A large number of potential compounds were investigated for application as X-ray analyzer crystals with 2d spacings from 25 to 100A. Four crystals with 2d values from 31 to 90A were developed and show exceptional promise. Although large crystals of these compounds were not grown, X-ray analysis of small crystals indicated excellent reflectivities. (Author)

Optics

PB 163 265 OTS $2.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
THE EFFECT OF TEMPERATURE ON THE TRANSMISSION CHARACTERISTICS OF COLORED GLASS FILTERS, by Saul Haffner. Sep 54, 21p. 11 refs. Technical rept. 2069.

DESCRIPTORS: *Filters (Electromagnetic wave), Glass, Colors, Optical properties, *Light transmission, Temperature, Photometers, Spectroscopy.

Variations in the transmission of light through some colored glass filters is considerable for large changes in temperature. Some results of tests conducted at temperatures other than 25°C may be incorrect, and a method of compensating for temperature variations is needed. (Author)

NASA N63-16392 OTS $0.50

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
SPECTRALLY SELECTIVE PHOTODETECTORS FOR THE MIDDLE AND VACUUM ULTRAVIOLET, by Lawrence Dunkelman, Walter B. Fowler and others. May 63, 13p. 32 refs. Technical note D-1759.

LA-2837 OTS $2.50

Los Alamos Scientific Lab., N. Mex.
LASL LENS DESIGN PROGRAM FOR THE IBM 7090, by C. A. Lehman. Rept. on Contract W7405-eng-36. Feb 63, 113p. 3 refs. NASA N63-15212.

Solid State Physics

TID-17912 OTS $2.60

Arizona State U., Tempe.
AN INVESTIGATION OF THE ELECTRICAL AND OPTICAL PROPERTIES OF SEMICONDUCTORS AND INSULATORS WHICH HAVE BEEN IRRADIATED BY FAST NEUTRONS. Final rept. on Contract AT(11-1) 715. Jan 63, 29p.

AD-264 249 OTS $1.60

Army [Electronics] Research and Development Lab., Fort Monmouth, N. J.
LAPPING AND POLISHING OF SILICON MONOCRYSTALS, by W. B. Pharo. Apr 61, 18p. 1 ref. USASRDL Technical rept. 2188.

DESCRIPTORS: *Semiconductors, Manufacturing methods, *Production, Single crystals, *Silicon, Processing, Surface properties, *Precision finishing, Preparation, Abrasion, Abrasives, Aluminum compounds, Oxides, Diamonds, Industrial diamonds, Powders, *Surfaces, Pickling, Solutions, Carbon compounds, Phosphides, Electrolytes, *Silicon crystals.

Details of an investigation to obtain high-quality silicon microsurfaces by cutting, lapping, and polishing processes and techniques are presented. The material used was low dislocation-density silicon, grown by the Czochralski method. The cutting, lapping, and polishing techniques described, however, should be applicable to any single-crystal silicon material. Diamond paste and aluminum-oxide grit were the two polishing compounds used. In experiments on etching of polished surfaces, more damage was observed on diamond polished wafers. The heat resulting from the polishing operation caused a plastic deformation on the surface which was removable by a light-diluted CP_4 etch. As a result of this investigation, a completely scratch-free wafer surface was obtained as observed under 85X magnification, dark-field illumination. (Author)

NAA-SR-MEMO-7428 OTS $1.60

Atomics International, Canoga Park, Calif.
IRRADIATION DAMAGE AND SUBSEQUENT RECOVERY IN METALS THROUGH MEASUREMENTS OF ELASTIC MODULES AND DECREMENT, by J. C. Robinson. Rept. on Contract AT(11-1)GEN-8. 31 May 62, 14p.

TID-17935 OTS $2.60

Brown U. Div. of Applied Mathematics, Providence, R. I.
INVESTIGATION OF IRRADIATION EFFECTS IN SOLIDS, by Rohn Truell. Annual rept. 1962, on Contract AT(30-1)1772. 22p.

GEMP-200 OTS $1.25

General Electric Co., Cincinnati, Ohio.
COMPUTER PROGRAMS DESCRIBING COLLISION CASCADES IN BINARY MATERIALS. II. WURTZITE STRUCTURE, by D. G. Besco and J. R. Beeler, Jr. Rept. on Contract AT(40-1)2847. Feb 63, 50p. 10 refs.

NASA N63-14276 OTS $0.50

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
APPARATUS FOR THE MEASUREMENT OF TRANSPORT PROPERTIES OF POLAR SEMICONDUCTORS, by Martin M. Sokoloski and Felix E. Geiger. Mar 63, 14p. 21 refs. NASA TN D-1695.

TID-17520 OTS $1.60

Institute of Metals and Explosives Research, U. of Utah, Salt Lake City.
SOLID SAMPLE PREPARATION FOR THE INFRARED SPECTROPHOTOMETER BY FREEZE DRYING, by G. C. Anderson and F. A. Olson. Technical rept. no. IV on Contract W-7405-eng-26. 20 Nov 62, 13p.

MRC-341 OTS $2.60

Materials Research Corp., Orangeburg, N. Y.
IRON SINGLE CRYSTAL PREPARATION, by R. T. Brenna, C. F. Malo, Jr. and others. Letter rept. no. 2, 1 July-1 Oct 62, on Contract AT(30-1)2980. 29 Oct 62, 21p.

ORNL-1214 OTS $7.60

Oak Ridge National Lab., Tenn.
PHYSICS OF SOLIDS INSTITUTE, ed. by D. S. Billington and J. T. Howe. Rept. for period ending 31 Oct 51 on Contract W7405-eng-26. 24 June 52, declassified 12 July 60. 74p.

ORNL-1677 OTS $8.10

Oak Ridge National Lab., Tenn.
SOLID STATE DIVISION SEMIANNUAL PROGRESS REPORT, ed. by J. T. Howe. Rept. for period ending 28 Feb 54 on Contract W7405-eng-26. 19 May 54, declassified 30 June 59. 80p. 30 refs.

TID-17389 OTS $1.60

Pennsylvania U., Philadelphia.
OPTICAL AND MICROWAVE INVESTIGATIONS OF SOLIDS, by E. Burstein. Rept. on Contract AT(30-1)2395. [1962] 17p.

TID-15068 OTS $2.60

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
REVIEW OF INTERNAL FRICTION DUE TO POINT DEFECTS, by B. S. Berry. Rept. on Contract AT(30-1)2811. 7 Aug 61, 21p. 49 refs..

NASA N63-14204 OTS $3.60

William Marsh Rice U., Houston, Tex.
THE TEMPERATURE DEPENDENCE OF THE MICROYIELD POINTS IN PRESTRAINED MAGNESIUM SINGLE CRYSTALS, by D. E. Hartman and J. M. Roberts. Rept. on Grant NsG-6-59. [1963] 34p. 36 refs.

Theoretical Physics

TID-17411 OTS $12.50

Florida State U., Tallahassee.
EXCITON THEORY: APPLICATION TO H-BONDED COMPLEXES, by Mohamed Ashraf El-Bayoumi. Technical rept. no. 4 on Contract AF 18(600)678 and Bull. no. 1, on AT(40-1)2690. 30 Jan 61, 176p.

NASA N63-16291 OTS $0.50

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
ELECTRON-HYDROGEN PHASE SHIFTS JUST BELOW THE INELASTIC THRESHOLD, by Aaron Temkin. May 63, 8p. 9 refs. Technical note D-1720.

NYO-10253 OTS $2.60

Rochester U., N. Y.
IRREDUCIBLE REPRESENTATIONS OF GENERALIZED OSCILLATOR OPERATORS, by T. F. Jordan, N. Mukunda, and S. V. Pepper. Rept. on Contract AT(30-1)875. [1962] 29p. NASA N63-13322.

Thermodynamics

NYO-10345 OTS $2.60

Atlantic Research Corp., Alexandria, Va.
THE EFFECT OF APPLIED VOLTAGE ON BOILING HEAT TRANSFER, by Michael Markels, Jr. and Robert L. Durfee. Annual progress rept., Sep 60 - Feb 62, on Contract AT(30-1)2404. 2 June 62, 28p.

TID-17525 OTS $1.60

Heat Transfer Lab., U. of Minnesota, Minneapolis.
RESEARCH ON HEAT TRANSFER TO FLUIDS FLOWING THROUGH NON-CIRCULAR CHANNELS, by E. R. G. Eckert and J. L. Novotny. Progress rept. on Contract AT(11-1)659. Dec 62, 14p.

UCRL-10631 OTS $1.25

Lawrence Radiation Lab., U. of California, Berkeley.
DESIGN OF A DIFFERENTIAL CALORIMETER SUITABLE FOR MEASUREMENT OF HIGH TEMPERATURE HEATS OF SOLID STATE REACTIONS, by John O. Barner. Master's thesis. Rept. on Contract W7405-eng-48. 29 Jan 63, 49p. 7 refs. NASA N63-15488.

NASA N63-16669 OTS $0.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
CALIBRATION OF A THERMAL-CONDUCTIVITY VACUUM GAGE IN THE RANGE OF 10^{-4} TO 1 TORR BY MEANS OF A VOLUME-RATIO CALIBRATION SYSTEM, by Raymond Holanda. June 63, 27p. 9 refs. Technical note no. D-1729.

NASA N63-15471 OTS $0.75

Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
A STUDY OF THE EFFECT OF MULTI-G ACCELERATIONS ON NUCLEATE-BOILING EBULLITION, by Robert W. Graham and Robert C. Hendricks. May 63, 31p. 10 refs. Technical note D-1196.

Wave Propagation

NASA N63-17143 OTS $0.50

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
THE EXCITATION OF ELECTROACOUSTIC WAVES BY ANTENNAS IN THE IONOSPHERE, by H. A. Whale. June 63, 18p. 13 refs. NASA TN D-1760.

NASA N63-16221 OTS $1.10

New York U. Coll. of Engineering, N. Y.
THE PERFORMANCE OF A FLAT-STAGGERED FILTER BANK FOR RECOVERING TONE BURST TELEMETRY SIGNALS, by Bernard Harris and Robert C. Sommer. Rept. on Contract NAS5-408. 29 Jan 62, 10p. Technical Memo. 23.

RESEARCH METHODS, TECHNIQUES AND EQUIPMENT

ANL-6600 OTS $15.50

Argonne National Lab., Ill.
ANNUAL REPORT 1961 [ON RESEARCH]. Rept. on Contract W-31-109-eng-38. 234p.

RDA-3 OTS $0.50

Atomic Energy Commission. Div. of Technical Information Extension, Oak Ridge, Tenn.
RESEARCH AND DEVELOPMENT ABSTRACTS OF THE USAEC. Rept. for July-Sep 1962. 111p.

RFP-301 OTS $2.60

Dow Chemical Co., Denver, Colo.
SPINDLE GROWTH ANALYSIS, by B. G. Mills. Rept. on Contract AT(29-1)1106. 15 Sep 62, 24p.

Communication Theory

NASA N63-17203 OTS $4.60

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
OPERATIONS WITH AN EXPERIMENTAL SATELLITE, by D. G. Mazur. 1 May 63, 44p. NASA TM X-50104; NAS X-620-63-86.

NASA N63-15061 OTS $8.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
CODING THEORY AND ITS APPLICATIONS TO COMMUNICATIONS SYSTEMS, by Leonard Baumert, Mahlon Easterling and others. Rept. on Contract NASw-6. 31 Mar 61, 91p. 31 refs. Technical rept. no. 32-67.

NASA N63-14881 OTS $2.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
PHASE-LOCKED LOOP DYNAMICS IN THE PRESENCE OF NOISE BY FOKKER-PLANCK TECHNIQUES, by A. J. Viterbi. Rept. on Contract NAS7-100. 29 Mar 63, 24p. 14 refs. Technical rept. no. 32-427.

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